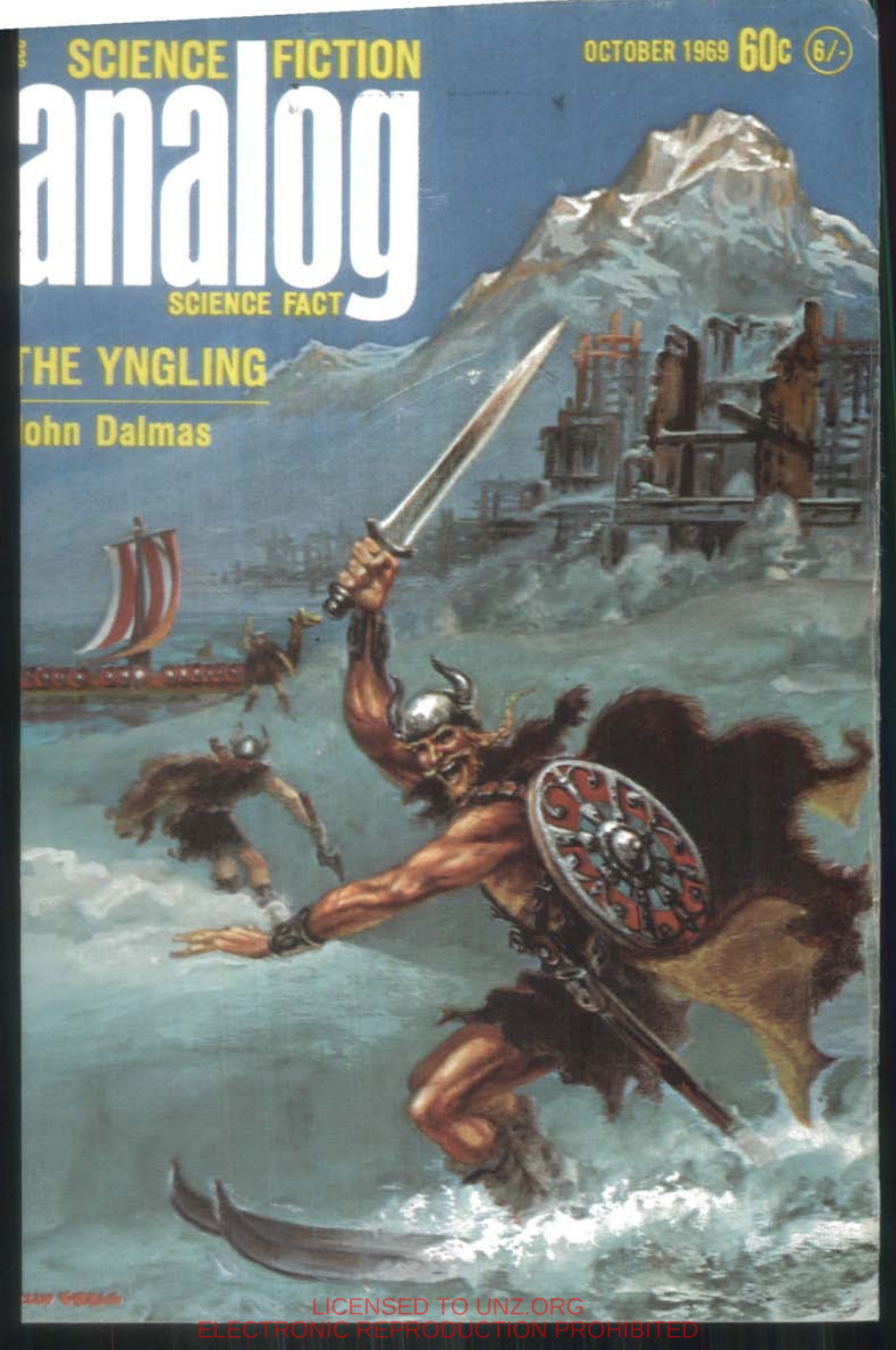

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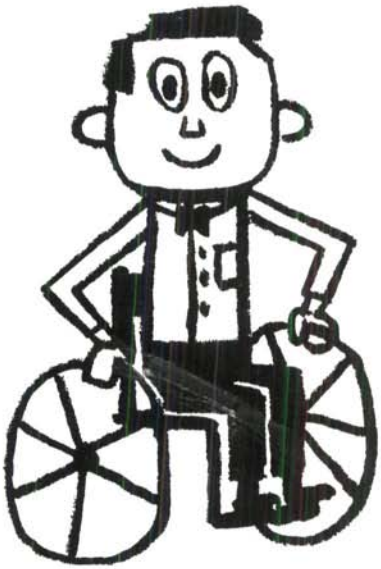

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SERIAL

THE YNGLING, John Dalmas 8
(Part One of Two Parts)

NOVELETTES

THE BIG ROCK, Robert Chilson 77
COMPASSION, J. R. Pierce 138

SHORT STORIES

A RELIC OF WAR, Keith Laumer 66
TEST ULTIMATE, Christopher Avail 111
JUMP, William Earls 126

SCIENCE FACT

PROTON TO PROTON, Dean Wilson 98

READER'S DEPARTMENTS

THE EDITOR'S PAGE 4
IN TIMES TO COME 75
THE ANALYTICAL LABORATORY 161
BRASS TACKS 163
THE REFERENCE LIBRARY, P. Schuyler Miller 168

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A DIFFERENCE OF INTELLIGENCE

Editorial by John W. Campbell

There have been very few solid studies of the question of race-genetics and intelligence; the National Academy of Sciences in its recent two hundred to ten rejection of a proposal to investigate the subject stated it was politically inexpedient to inquire.

Now inasmuch as that particular brand of political "expediency"—a refusal to make any objective, adequate study of the problem—underlies the present riotous (and I don't mean riotous in the sense of laughable) situation, isn't it now politically *in*expedient to continue wearing blinders?

First, we most certainly have a problem that does have a sort of quasi-Aristotelian aspect—it *is* a problem in Black and White. And it's long been observed that refusing to accept facts does not aid solution of problems.

Second, as I pointed out in a filler item last month, that two hundred to ten vote of the National Academy of Sciences actually meant: "We're afraid to bring up the subject, because we already feel certain that Negroes are inferior, so we won't mention it out loud."

No matter which side you're on—that refusal to study the problem is the most sure-for-certain method possible to guarantee perpetuation of the problem.

Very few halfway honest studies of race and IQ have been made, with adequate breadth and sufficient numbers, to make the statistics have correlative value. The largest, most careful, and most adequately documented and analyzed, I believe, was the Savannah County Schools System study.

Elaborate efforts were made to compare Black and White children from homes of similar economic and educational background, under similar conditions of schooling. The full data on the study is available to anyone who really is interested in getting facts.

It showed that Black children had lower IQ's, and learned more slowly, than White children did. Even when social and economic backgrounds were similar, and schooling was equally good. They made comparisons between Black children of Black professionals—lawyers, doctors, et cetera—and

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compared them with White children of White professionals of equivalent economic level.

It was an entirely sound analysis of the results—and the Black children came out lower.

If you don't like my summary, don't argue with me—I haven't the forty pages needed to print the data. Get the original data yourself.

More recently a similar study has been made in Northern school systems, by an entirely different team; the results were published in the *Harvard Education Review*.

Again, children of families in equivalent socioeconomic levels—*not just ghetto children*—were compared. The Whites consistently showed higher IQ marks than the Black.

O.K.—now we have a set of data: there is a correlation between White-Black racial difference, and a difference in IQ.

Interesting; we have a fact, but what is that fact? What's "IQ"? What does *it* correlate with?

Well, IQ does show a very high positive correlation with success in standard school system education. That is, a high IQ guarantees pretty well that you'll make satisfactory school grades reasonably easily.

It does *not* say you'll make good in real-world competition; check the number of Ph.D.'s to be found in the various big-city skid-row districts. Tom Edison didn't get much by way of schooling; he was a grade-school dropout.

So the correlation of Black with low-IQ gives us a correlation with poor showing in schools—but doesn't, actually, say anything else.

Now IQ is technically so defined that it is *not* an "intelligence" index actually—it's strictly a *precocity* index. The highest score ever achieved on an IQ test was made by a chimpanzee—a score of 250. It was a test intended for six-month-old babies, and depended on the degree of development of neuromuscular coordination skills. Chimps have shorter life spans, and reach maturity faster; at six months a chimp is far ahead of a human infant; naturally, when you apply the precocious-development standard, the chimp comes out as "Super-high genius."

The essential trouble with the IQ standard—and our whole approach to this problem of intelligence, race, ethnic groups and cultures—is the utterly stupid proposition that *intelligence is a linear function and there can be only one kind.*

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That is, that there can be only *one* useful, functional road to real-world problem solving, and that one road is along the single line of scholastic study.

Obviously, you're going to have one hell of a time prying the professional scholars loose from that proposition—make them give up the Great and Holy Truth that Scholarship Is The Only Way To Truth And Wisdom. That's their life-dedication. To them it is an unshakable and unarguable truth that IQ, which correlates with scholarly abilities, *is* Intelligence.

And when they say that, they mean the one, sole, unique and only-possible form of Intelligence.

Let me make a clear and careful distinction; the idea that IQ tests are "culturally loaded" has long since been made again and again.

Yeah—I know. They are.

That's *not* what I'm talking about.

I'm suggesting a totally different thing. That there are systems-of-thinking that do not work at all the way the scholarship system does, but do solve problems.

Look at an analogy; a porpoise has ears of excellent quality. So do human beings. Our ears work magnificently for Man in his natural environment; a porpoise's ears would, in Man's environment, be totally useless. As useless as Man's are under water.

But both organisms have tremendously developed, and exceedingly efficient hearing mechanisms. They're just basically different, *in nature*. It's not a difference of degree—it's a difference of *kind*.

Chinese music sounds to the average Westerner like a fight involving a number of tomcats in a tin-bucket factory. I imagine a classic Mandarin would have similar remarks to make about Western music.

Yet either Chinese or Westerner could readily learn the value system involved in the other music, and appreciate it as music, with some training.

A porpoise never could. With an auditory mechanism having a range of frequencies ten times as great as the human—either style of music would be Poor Johnny One Note to him. With an auditory center developed to extract distance, surface texture, size and speed information from sonic echoes—human music would appear appallingly shallow, monotonous, and weak.

It isn't that the two types of hearing must be rated as "superior" and "inferior"—but there most bodaciously damn well *is* a difference! To deny that there's a difference of *kind* would be insane; to assign a difference of *quality* is certainly beyond our present level of wisdom. But porpoise hearing does the job in its environment enormously better than human hearing would under

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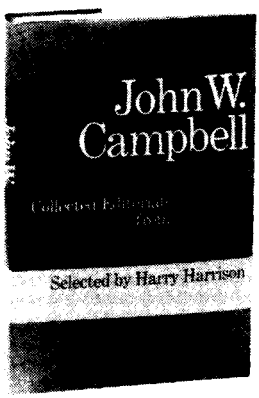

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water. And human hearing is vastly better adapted to living on land.

The Scholarly type has one particular *type* of intelligence highly developed. Naturally he thinks that is *the* type of intelligence. He has developed a system of tests, called IQ tests, that do a good job of correlating responses on those tests to success in scholarly affairs.

I have a millionaire neighbor with a tested IQ of 85. He didn't inherit any of his wealth; his solid reputation for unswerving honesty has helped him build his contracting business.

I've another neighbor who graduated from a night trade school; he hasn't quite reached that first million. I believe his IQ would test around 110 or so.

I had a Mensa-member taxi driver the other day, with an M.A. in history.

My statistics may be somewhat inadequate—I do have more data in that line—but my conclusion is that the correlation between IQ, Scholarly Intelligence, and objective achievement in the real world is decidedly less than 1.000.

Now let us consider another matter. A certain genetic pool—a people—lived in an area of very poor resources. The weather was normally a cold drizzle, the land

continued on page 177

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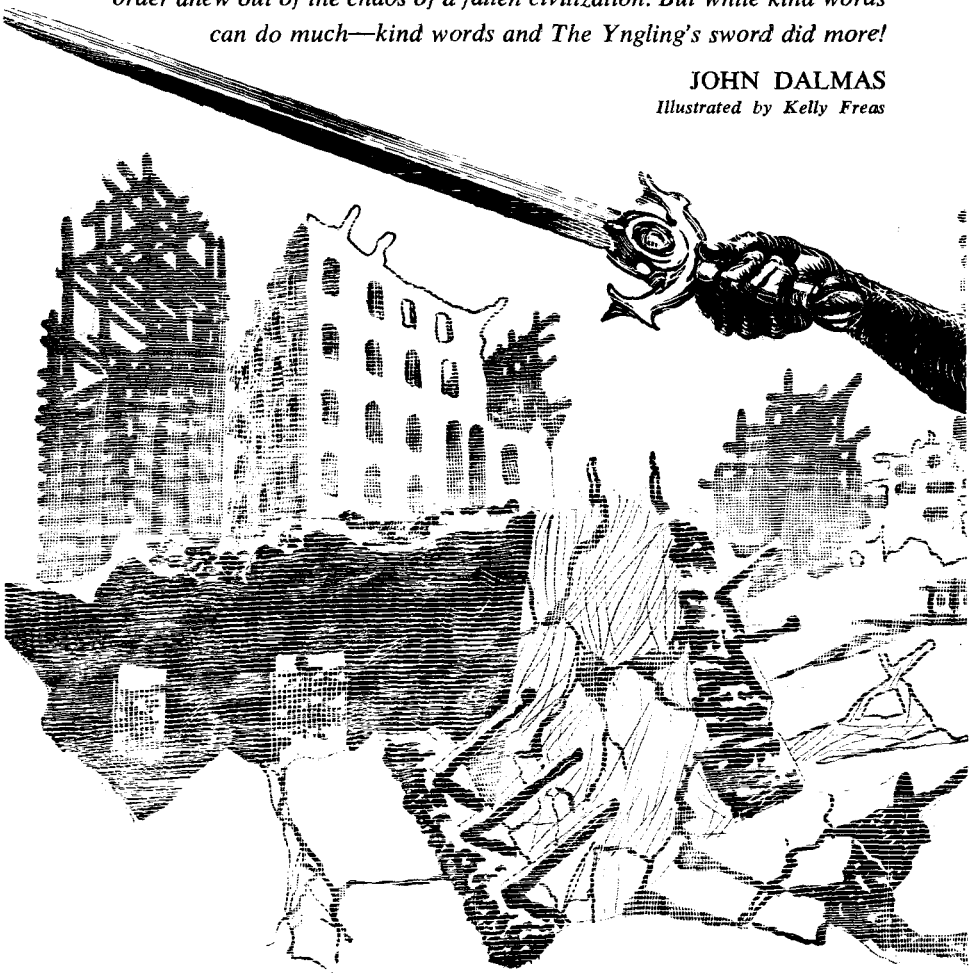
the yngling

Part One of Two Parts

A thousand years hence, a new feudalism, a new Viking culture—and the Brotherhood of Psis trying to bring order anew out of the chaos of a fallen civilization. But while kind words can do much—kind words and The Yngling's sword did more!

JOHN DALMAS
Illustrated by Kelly Freas



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Nils Hammarson stood relaxed among a few freeholders, thralls, and two other sword apprentices, watching two warriors argue in the muddy beast trail. In his eighteenth summer, Nils's beard was still blond down, but he stood taller and more muscular than any sword apprentice of the Wolf Clan for many years. And sword apprentices were selected at puberty from among all the clan, even the sons of thralls, for their size and keenness.

The argument they listened to was personal, and not a clan dispute. The clans of the Svear had met to hold a ting, and trade, and take wives. And though the ting now had closed, clan feuds were in abeyance until the clans dispersed to their own lands. Only personal fights were allowed.

The warrior of the Wolf Clan was smaller and his beard was more gray than brown, but he refused to back down before his larger, younger adversary. The warrior of the Eagle Clan suddenly shot out his large left hand to the necklace of wolves' teeth, jerked forward and down. The older man saw the move and kept his balance, although the leather thong bit hard into his neck sinews. He swung a knobby fist with his heavy shoulder behind it, driving a grunt from the younger. For a moment they grappled, each with a knife in his right hand and the other's knife wrist in his left. Briefly their arms sawed the air, their bare feet carrying them circling in a desperate dance, muscles bunched in their browned torsos while calloused heels strove to trip.

Then strength told and the warrior of the Wolf Clan toppled backward. His breath grunted out as his heavier opponent fell on him; his left hand lost its sweaty grip and quickly the other's blade drove under his ribs, twisting upward through heart and lungs. For a brief moment, as his blood poured over his opponent's hand and forearm, his teeth still clenched and his right arm strained to stab. Then his body slackened and the warrior of the Eagles arose, panting and grinning.

Most of the watchers left. But Ragnar Tandson and Algott Olofson still stood, glaring at the killer of their clansman, for they were sword apprentices and nearly matured. But being apprentices they were forbidden to fight a warrior, lest they be killed in the bud. And there were bounds on what they could say to a warrior, warriors being forbidden to kill them.

But the wish to kill was in their faces.

The Eagle warrior looked at them, his grin widening to show a dead tooth that had turned gray. "I see the cubs are beginning to feel like real wolves," he said. His eyes moved to Nils Hammarson, who stood still relaxed, a slight smile on his face. "All but the big one, eh? A thrall's son, I'll bet, strong as an

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ox and almost as quick. Or maybe your blood runs hot, too, but you hide it behind a smile."

Nils shifted his weight easily and his voice was casual. "Nay, Du." For a sword apprentice to address a warrior with the familiar pronoun bordered on insult. "I was memorizing your face. The old man lying there is my kinsman, Olof Snabbhand, and in one year I'll be wearing warrior's braids." He paused. "Not that everyone with braids deserves to be called warrior."

The Eagle warrior's eyes narrowed in his darkening face and he strode toward the youth. He aimed a fist at the flaxen head. But the fist that met him was quicker, his steel-capped head snapped back, and he fell heavily in the trampled mud, his head at an odd angle. Algott Olofson knelt by him quickly, then rose. "You've killed him," he said gravely.

But the ting was over, and crimes between clans would not be judged again until the next year. Therefore Nils was free to go home. He spent his summer as any sword apprentice would, hunting bear and boar, rowing out into the long lake to draw in nets, but particularly training with his ring mates. They lifted boulders and wrestled. They swung, parried and thrust at shadow enemies with heavy iron practice swords, twice the weight of a war sword. They sparred with birch swords and weighted leather shields, and sent arrows at staves marked with the totems of other clans.

But if his activities were normal, the subtler things of life weren't. Everyone knew that at the next ting he would be judged, and when one remembered this it was hard to be at ease with him. He could be executed. Or he could be labeled a renegade, to live alone in the forest without clan protection, fair game for hunters. The least sentence possible was banishment.

Nevertheless, Nils Hammarson seemed about as always, relaxed, mild-spoken and observant. He had changed mainly in one respect: before, in sparring, he had usually been content to parry and counter, rarely pressing a vigorous attack. Although he invariably won anyway, the drillmaster had sometimes thrashed him for this. Now, without ferocity but overpoweringly, his birch club-sword thrust and struck like the weapon of a berserker, making his bruised and abraded ring mates exceed themselves in sheer self-defense. Their drillmaster, old Matts Svärdkunnig, grinned widely and often, happier than anyone could remember. "*That* is how a Wolf should fight," he would bellow. And he had a new practice sword forged for his protégé, heavier than any other in the clan.

When the cold weather came, late in September, the sword apprentices butchered cattle, drink-

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ing the steaming blood, smearing each other with gore and brains, and draping entrails about their necks and shoulders, so that they would not be squeamish in battle. And in late October, after the first heavy snow, they slipped the upturned toes of their ski boots under the straps and hunted moose and wild cattle in the forests and muskegs. After that, as was customary for sword apprentices, Nils Hammarson wrapped cheese and meat in his sleeping bag of glutton skins, took his bow and short sword, and went for days at a time into the rugged uninhabited hills above Lake Siljan. But now he did not hunt the wolf, their clan totem, with a ring mate. In fact he did not hunt so much as travel, northwest even into the mountains of what tradition called Jämtland, where long glaciers filled the valleys. The great wanderer of the Svear, Sten Långresare, told that the ice had moved down the valley more than three kilometers in five years. Someday, he said, the ice will reach the sea.

Nils would have liked to have seen the glaciers in summer, when the land was green, but he expected never to be here again.

Not that he thought he would be executed—struck down like an ox to have his head raised on a pole at the ting. The circumstances had not been that damning. And this belief was not born in hope, nor did it give rise to hope. It was a simple dispassionate evaluation that would prove correct or incorrect, but probably correct.

But, if it came down to it, he would escape. No one had ever tried to escape a sentence of the ting. It would be considered shameful. But Nils did not believe it would be shameful for him, nor did his blood quicken at the thought.

He simply knew that he was not intended to have his head lopped off before the clans.

In early July, after the hay was cut and stored, another ting was held. It heard a number of complaints and disputes. Warnings were given. Feuds were approved. Fines of cattle, potatoes and grain were levied, and backs flogged. A hand was cut off. And from a copper-haired head runnels of blood dried on a pole at the ting ground.

At the trial of Nils Hammarson two witnesses were heard: Ragnar Tandson and Algott Olofson. They were Nils's friends and ring mates, but no one would lie to a ting. After their testimony the council sat in quiet discussion in its tent for a time, then emerged and mounted the platform of hewn timbers. Warriors and freeholders covered the broad trampled field. Axel Stornäve chief of the Svear, arose from his carved throne and stood before the clans in his cloak of white owl skins. His voice boomed, showing little sign of his sixty years.

"Nils Hammarson angered a

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warrior," he said, "but his speech was within bounds, though barely.

"Nils Hammarson struck a warrior whose attack on him was without arms and not deadly.

"Nils Hammarson killed a warrior, though without intention.

"Nils Hammarson is stripped of all rights but one, beginning with the second new moon from now. By that time he must be gone from the lands of the tribes. If he is not gone by the second new moon, he will be declared a renegade. Notice of this judgment will be sent to the Götar and the Norskar, and they will not take him in.

"One right is retained. Nils Hammarson is in his nineteenth summer and has fulfilled his sword apprenticeship. Where he goes he will be an outlander, unprotected by clans or laws. Therefore, when the ting is over his hair will be braided and he will leave the land as a warrior."

The Eagle Clan grumbled among themselves at this leniency and some would have liked to do more than grumble, but the ting had ruled. Three days later Ulf Vargson, chief of the Wolf Clan, plaited the hair of the six Wolf sword apprentices who were in their nineteenth summers, and gave them their warrior names. And Nils Hammarson became Nils Järnhand, "Iron Hand."

II

Neovikings. The neovikings were members of a primitive post-plague Terran culture that evolved in Sweden and Norway after the Great Death that left less than 10^{-4} of the pre-plague population alive. They consisted of three tribes: the Norskar in southern Norway, the Götar in southern Sweden, and the Svear in central Sweden . . .

The term "neovikings" was applied to them by the post-plague psionic culture known as the "kinfolk." In some respects neoviking was not an apt term, for they were not sea rovers. They were primarily herdsmen, although hunting and fishing remained important in their economy and they practiced some agriculture. Perhaps their outstanding cultural feature was their unusually martial orientation, and in this they did somewhat resemble the medieval vikings. Tribe warred against tribe and clans carried on bloody feuds.

They increased despite their love of bloodshed however. Taboos, tribal laws and intertribal agreements restricted the causes of fighting, its circumstances and practices . . .

History. The rapid climatic deterioration finally became critical. They found it necessary to store increasing quantities of forage as the season of pasturage became shorter. Crops became poorer, and some lands that had been farmed became too waterlogged and cold to grow crops. Had this happened three or four centuries earlier they might have lapsed into a purely

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hunting and fishing culture, but they had become too numerous and sophisticated for that. A coastal clan, familiar with fishing boats, began to build vessels large enough to carry effective raiding parties to other parts of Europe, and a rather close analog of the medieval viking culture might have developed, had not . . .

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III

This was no fishing boat, but a cargo ship made for the open sea, and a full thirty meters long. The prow turned upward and the end was carved and painted in the likeness of a sea eagle with wings partly folded. The water was choppy and a brisk southwest wind blew. The ship's course being southwesterly, the sail was furled and the crew leaned into the oars, their brawny backs wet with sweat. Through the blue sky flocks of small white clouds scudded. The sun sparkled off millions of facets of sea surface, making Nils's eyes squint against the glitter. A low shore, featureless at first in the distance, drew gradually nearer, becoming low dunes backed by rolling heath. Woods of stubby oaks took form in some of the hollows. Nils Järnhand had never seen the sea before, nor oak woods, and now that his stomach had subsided he stood absorbing the beauty and novelty.

A break appeared in the dunes and became the mouth of a stream that flowed out of the heath. A short distance up the stream on its south side a town became visible past the shoulder of a dune. A lookout on the mast called down and the stroke quickened as the oarsmen began a chant, for this was their homeplace.

When the ship was tied to the wharf of oak timbers the oarsmen became stevedores, and under the captain's direction began to unload the pine planks that made up their cargo. A movement caught the captain's eye and he turned to see his passenger approaching. The captain was a big man but this fellow was bigger—more than a hundred and ninety centimeters tall he judged, and his muscles were impressively thick and sinewy even to one accustomed to the sight of brawny oarsmen. His corded torso was bare and brown beneath the simple leather harness that supported his sword belt. Soft deerskin breeches were wrapped close around his calves by leather strips and his calloused feet were bare. A necklace of wolves' teeth hung on a thong across his thick chest, and a wolf's tail, fastened to the crown of his steel cap, hung down his muscular back. Flaxen braids hung to his shoulders. Obviously a warrior of the northmen, and a new one, the captain thought, noting the sparse soft beard and moustache so

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out of character with the physique.

Nils addressed the captain. "Will you hire me to help unload cargo?"

"When did warriors start hiring out as labor?" the captain asked.

"When they have spent their last coin for passage and need something to eat."

"All right. One krona when the cargo is all on the wharf, if you work well and make no quarrels. Otherwise nothing, and the arrows of the town wardens if there is trouble." The captain believed in giving a man a chance and also in making things clear from the beginning.

He matched Nils with a thick-armed man of medium height, and without words they made a point of pride in carrying bigger loads than any other pair working. Even with the breeze, all of them were soon dripping sweat—a familiar and agreeable enough experience both to oarsmen and warrior. Soon Nils removed helmet, harness, and sword, laying them with his other things on a rowing bench forward.

Well into the afternoon one of the crew suddenly shouted, "Hey! Stop!" A youth, who had boarded the ship unnoticed, leaped from the gunwale carrying Nils's scabbarded sword. The captain, on the wharf supervising the piling, bellowed, drew his knife and threw it, but it clattered uselessly on the cobblestone. Nils's bare feet hit the wharf running. The thief was quick. He reached a corner and sprinted out of sight. A moment later Nils made the turn and the thief realized he had dangerously underestimated both the weight of the sword and the speed of a barbarian who had spent much time running on skis. Now he drew the sword as he ran, then turned and faced his pursuer. Nils stopped a few meters from him, and a moment later several of the crewmen ran up, panting, to stand near.

"I can stand here as long as you can," Nils pointed out matter-of-factly. "If you try to run away again with the sword, I will easily catch you. And if you run at me to kill me you won't be able to. But, if you lay the sword down and walk away, I'll let you go."

The thief scowled and licked his lips nervously. He was Nils's age, lean and wiry. Suddenly he rushed at Nils, the sword raised to one side in both hands, ready to swing. The sailors scattered, and in that instant Nils sprang high, above the swinging blade. A calloused foot shot out, a powerful thigh driving the heel into the thief's chest and hurling him backward. He skidded on his back and lay still.

"What must I do now?" Nils asked.

"Is he dead?" asked the sailor that Nils had worked with.

"He's dead all right," Nils assured him, without needing to examine the body.

"Well then, there's nothing to do now. A warden's likely to come

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around and question us, and we'll tell him what happened. He'll have the body taken away and that'll be the end of it. There won't be any trouble for you, if that's what you mean."

Nils and the sailor began to walk back to the wharf.

"And what about his clan?" Nils wondered.

"What's a clan?" the sailor asked.

"A clan is, well—" Nils had never thought about this before. It was as natural a part of life as eating or breathing. "A clan is like the family, in a way, but much bigger, and the members fight for each other and take vengeance if need be."

"In Denmark we don't have clans. Countrymen have lords. But townsmen and sailors are loyal mainly to their bellies."

"And I won't be judged at a ting?"

"Ting? I've never heard the word." The sailor paused. "Swordsman, let me give you some advice. The world you've come to is a lot different from your barbarian backcountry. Its ways and even its speech are different. You and I can talk together partly because Danish and Swedish aren't so different in the first place but also partly because we sailors are used to going to ports in Götaland and adapting our speech for Swedish ears. But most Danes have never heard a Swede, and you won't find it so easy to talk to them at first. And if you travel farther, to the German lands for example, you won't understand their ways or a thing they say. If you're going to travel in foreign lands, you'd better learn something about their customs; otherwise even a man like you will find only hardship or death."

The inn loomed two stories high in the darkness and was made of planks instead of logs. The shutters were open, lighting the street in front of the windows and leaving nothing between the noise inside and the passersby outside. Nils had a krona in his pouch, strong hunger in his gut, and the sailor's words in the back of his mind as he moved lightly up the steps.

The noise didn't stop as he crossed the room, but the volume dropped a few decibels and faces turned to look. The innkeeper stared a moment at the bizarre, but dangerous looking, barbarian wearing a pack with a shield on it, a slung bow, and a sword. Then he walked over to him.

"Do you want a bed, stranger?"

The sailor had been right. Nils understood the question but Danish speech was different. He might indeed have trouble understanding longer speech or making himself clear. At any rate he would speak slowly.

"No, only food," he said. "The ground will have to be my bed, or else I'll run out of money too soon."

The innkeeper eyed him narrow-

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ly and leaned a stout forearm on the bar top. "You plan to sleep in the open, if I take your meaning." He, too, spoke slowly now. "In that case more than your money may disappear; your life's blood also. If you don't know that, then the world is a dangerous place for you."

"I have been robbed already today," Nils said. "Are there so many thieves in Denmark?"

"There are thieves everywhere," the innkeeper answered, "and towns have far more than their share. Are you the barbarian who crushed the chest of Hans fra Sandvig with his bare foot?"

"If that was his name."

"Well, that's a service worth a free meal and a mug of beer with it," the innkeeper said, and called a waiter. "Dreng, take this man to a table. Give him a mutton pie and a mug of beer, and when the mug is empty, fill it once more."

Nils leaned over the pie with busy fork. He was aware that someone stood near the table watching him, and his eyes glanced upward occasionally as he ate. The watcher, of middle height, wore his yellow hair cropped close, and unlike the townsmen carried a short sword at his hip.

After a bit the man spoke. "You are a Swede," he said, "the one who killed an armed thief with only your foot." His speech was a hybrid Swedish-Danish, accented with a crisp treatment of the consonants.

Nils straightened from his plate. "Yes. I'm from Svea," he replied. And you are no Dane either."

"No, I'm a Finn—in our language we say Suomalainen."

"I've heard of the Finn land," Nils said. "Svea fishermen are sometimes driven there by storms. What do you want of me?"

"I am traveling about in the world and it's best not to travel alone. You're traveling, too."

"I'm used to traveling alone," Nils countered, "even in land without people, where wolves and bears hunt. I've slept buried in the snow without harm."

"Yes, but you're not in your homeland now. In Denmark there aren't any wolves or bears, but to the outlander, men are more dangerous."

"And where are you going now?" asked Nils.

The Finn did not answer at once. "I don't know," he said at last. "I seek a thing of great value, and go where my search takes me."

"Where your search takes you," Nils echoed musingly. "Suppose that's not where I want to go?"

"I believe it's as good as any for you," the Finn replied, "because if I'm right you don't have any place in mind. Also you don't know the ways and tongues of the world, and need a guide and teacher."

Nils leaned back and grinned. "You're the third today who's pointed out my ignorance to me. I believe you must be right. But tell

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me, why do you think I have no place in mind?"

"Well, for one thing, I suspect you don't know any place to go. But regardless, you're a warrior, and among your people it is good to be a warrior. Few warriors would willingly leave the fellowship of their clan to wander alone in the world. Probably you were exiled, most likely for killing outside the bans."

"Sit down," Nils said, motioning to a chair across from him. "Now I'll ask another question." His speech was easy and assured, like that of a warrior twice his age. "You say you seek a thing of great value. If it's so valuable, others may seek it with armed men. And if someone already has it, it may be strongly guarded. What will we do if we find it?"

"I don't know," the Finn answered. "I can only wait and see." He paused, started as if to speak, paused and then spoke. "You're a barbarian, young and very ignorant, but you are not simple. Not simple at all. Which is so much the better, for you'll be much more than a man to frighten robbers with."

Nils ate without saying any more, until the mug was empty and the plate wiped clean. He signaled the waiter and motioned toward the mug. "I'll travel with you a while," he said to the Finn, "for you were right about me in every respect; I am an outcast, and have nothing better to do. But there's a lot I need to know, about you and your quest as well as about the world, and I won't promise that our paths will continue together." He half rose and held out his large thick right hand. "I am named Nils Järnhand."

"Iron Hand. I believe it." The Finn retrieved his hand. "And I am Kuusta Suomalainen."

IV

Nils and Kuusta walked all day and never had Nils seen such farmland. The fields covered more land than the forests—broad fields of oats and barley, nearly ripe. Tame trees in rows, which Kuusta said bore fruit called apples. Large herds of cattle. Even the forests were unfamiliar to Nils. Most of the trees had broad leaves and were larger than the birches and aspens of Svea. And, although he saw familiar pine and spruce, some of the needle-leaved trees were strange, too.

And there were sheep, which Nils had never heard of before. Kuusta said that sheep were foolish, and easily caught and killed by wild dogs, which the Danes hunted relentlessly so that they were cunning and cowardly. In Sweden and Finland, he pointed out, it would be impossible to keep sheep because of the wolves and bears. But the fur of sheep, called wool, could be made into warm clothing, and

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this was what most Danes wore instead of hides.

Then Kuusta talked about the languages of men. They were as many as the kinds of trees that grow in Denmark, Kuusta said, and no one could learn any large part of them. But there was one that could be spoken by most people in most lands, at least to some extent, and was used by traders and travelers outside their own countries. It was called Anglic, and easy to learn.

Then he taught Nils a few Anglic phrases, starting with: "I am hungry. Please give me food. Thank you."

During the day they saw two small castles. Kuusta insisted they avoid these, leaving the road and keeping to the woods and hedgerows to pass them.

In the early evening they made camp and Kuusta went out to set rabbit snares. While he was gone Nils saw a deer, sent an arrow through it, and drank the warm nourishing blood. When Kuusta returned and saw the deer he became ill at ease, saying the Danish lords forbade their killing by anyone but themselves. When they caught a peasant who had killed a deer, they ordinarily knotted a rope around his neck and pulled him up off the ground to kick and jerk and swell in the face until he died. Then they'd leave him there, his toes a few centimeters from the ground, and the magpies or crows would relieve him of his eyes, and in the night wild dogs might come and feast on his guts.

Nonetheless the deer was dead and neither man was inclined to let it go to waste. They built a small fire, roasted the heart and liver and tongue, and ate while more meat roasted for the road. Then they lay in their sleeping robes as the fire burned down to embers.

"Now it's time for questions and answers," Nils said in the darkness, "about the thing you're hunting for."

Kuusta lay silent for a moment. "It's a thing that my people had never heard of," he said quietly, "nor yours either, I suspect. As a boy I wanted to see the world, so I left home and traveled. I hired on a Danish ship, as an oarsman. We went to Götaland for lumber, and took it to Frisland where the cattle are fat, but there is little timber. We took cattle to Britain then, where Anglic is the native tongue, and got the black stones that burn and took them to Frisland. There I jumped ship and walked south through the land of France, and through the land of Provence to the southern sea. In Provence, where there is no king, the lords are always at war with one another, and I took service with one as a mercenary. They use lots of mercenaries, and for that reason the language of their armies is Anglic.

"And in Provence I heard a legend, that I believe has its roots in truth, of a magic jewel called the

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esper crystal. Looking into it a man is supposed to be able to see and hear things far away, or things that haven't happened yet. It's even said that the holder can read the minds of others through it."

Then Kuusta lay silent again.

"And what would you do with this crystal if you had it?" asked Nils.

"Get rich, I suppose," Kuusta answered.

"Have you thought how hard it would be to steal a thing as valuable as that from a person of great wealth and power when that person can see and hear things far away, look into the future, and maybe even read the minds of those around him?"

Kuusta lay quiet for some time, while the embers faded to dull red, but Nils knew he was not asleep. "Yes," he said finally, "I've thought about it. But I need to have something to strive for, otherwise life would have no savor."

"And where do you think this esper crystal might be?"

"I don't know. The story is that once it was in a land east of the southern sea. But, if it really exists, and if a person travels and watches and listens, he may learn where it is. Something like that must leave evidence."

"I'm not like you," Nils said. "I need nothing to strive for. You were right, in the inn. I'd have been happy to stay with my clan, hunting, raiding, fathering a line of warriors, and watching the seasons follow one another. Taking an arrow in my time or possibly growing old. But it's my nature to do what is indicated, without worry or pain, and I am also happy to sleep in a Danish oak forest, traveling I don't know where. I have no desire for this esper crystal, or to get rich. But I'll travel with you for a while and learn from you."

Within a few moments Nils's breath slowed to the cadence of sleep, and in Kuusta's mind the esper crystal shone like a cut gem glowing white, occupying his inner eye, until there was nothing else and he, too, was asleep.

The early light wakened them and they ate venison again. Kuusta visited his rabbit snares to no avail while Nils dragged the deer carcass into a thicket. Each put a portion of roast haunch into his pack—enough to last until it would be too foul to eat—and they set off.

Soon they came out of the forest again and the road was a lane between hedges atrill with birds. Nils found the land pleasant. His eyes moved about, seeing things, interpreting, as he repeated the Anglic that Kuusta spoke for him.

He interpreted the rapid thudding of hooves, too, but the hedges at that point were a thick lacing of strong thorny stems confining them to the lane until they could find a break. The horsemen were in sight almost as soon as the hoofbeats

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were heard, and Nils and Kuusta stood aside as they came up, as if to let them pass. The five horsemen pulled up their mounts however, and looked grimly down at the two travelers. Their green jerkins told Kuusta that these were game wardens of the local lord. Their leader, his knighthood marked by helmet and mail shirt, sat easily, sword drawn, smiling unpleasantly. Leaning forward, he reached a strong brown hand toward Kuusta.

"Your pack, rascal," he said.

Kuusta handed up his pack and the knight threw it to one of his men. Then he looked long and hard at Nils, who clearly was not an ordinary wanderer. "And yours," he added.

Nils shrugged calmly out of his straps, took his shield off the pack, and handed the pack to the waiting hand. Kuusta tensed, suddenly convinced that Nils would jerk the man off his horse then, and they would die quickly by arrow bite instead of slowly by noose. But Nils's hand released the pack and he stood relaxed. The men who opened the packs took out the roast meat and threw packs and venison into the dust of the lane. The knight licked his lips.

"Poachers. Do you know what we do with poachers?" he asked in slow Danish.

Poacher was a new word to Nils, although he took its meaning from context.

"What is a poacher?" he asked.

The knight and his green-clad men grinned. "A poacher is someone who kills the lord's deer," he explained. "Poachers are hung with their feet near the ground, and the dogs eat them."

"I have killed deer all my life," Nils said matter-of-factly. "Large deer called moose, and wild cattle, openly, and it has never been called a crime."

The knight studied Nils. His speech was heavily accented and he was clearly a barbarian of some sort. The knight had hardly seen foreigners before. The barbarian's sword, shield, and steel cap were those of a man-at-arms, but his bare feet and torso were marks of a peasant. His manners were bolder than peasant manners though. His size and brawn were those of a champion, but his young unmarked face and scarless torso suggested green unblooded youth.

"What are you?" the knight asked.

"A warrior."

"Of what wars?"

"Of no wars. Until this summer I was still a sword apprentice."

"Like a squire," Kuusta interpreted for the knight. "He is a Swede of the Svea tribe. Their ways are different from yours."

"Does your lord have use of fighting men?" Nils asked.

"If they're any good."

"How does he test them?"

"They fight. With an experienced man-at-arms, or a knight."

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"Would he have use of two more?"

"I'm already of a mind to hang you from a tree, as a warning to others who might have a taste for venison," the knight answered. He studied them further. "But with one as big as you it does seem a waste. It's possible you might fight well enough to serve his lordship. Certainly you're big enough, and bigger. If you can't, you can always serve as a thrall—or for public execution." He turned to one of his men. "Tie them," he ordered.

The man dismounted agilely with a long leather rope and Nils and Kuusta submitted, wrists behind backs and loops around their necks. The horses trotted back down the lane then, in the direction they had been going, Nils and Kuusta running awkwardly behind, not daring to stumble. They were muddy with their own sweat and the dust kicked up by the horses, Kuusta cursing quietly but luridly in Finnish.

What kind of man is this Swede, Kuusta wondered? In town he seemed a great fighter but here he had submitted as docilely as a thrall. Yet they were alive instead of stuck full of arrows like two porcupines. And the ropes around their necks had not been thrown over an oak limb.

They were put in a cell together in the barracks, but shortly a man-at-arms came and led them into the courtyard. A grizzled veteran stood there, with several other knights and men-at-arms, among them the knight who had brought them in.

The old knight glowered at the two prisoners. "So you claim to be fighting men," he said.

"I am a freeman of Suomi," said Kuusta. "I've served as a mercenary, and like all Suomalainet I am highly skilled with the bow. In our country we live by the bow."

The veteran grunted. "Make him a mark," he ordered.

A man-at-arms picked up a horse dung and threw it fifty meters.

"Give him a bow."

Kuusta bent the unfamiliar bow, testing its flex and strength. "Can I use my own?" he asked. The old knight said nothing, so he fitted an arrow, drew back, and let go. The arrow struck centimeters short.

The old knight himself picked up a horse dung then and threw it high. Quickly Kuusta had to nock and draw, letting the arrow go when the target had already passed the height of the throw and was starting downward. The arrow broke it apart as it fell. Kuusta concealed his surprise.

The veteran tried not to look impressed. "Now you," he said to Nils, and signaled a man-at-arms who handed Nils his sword and shield. "And you, Jens Holgersen."

The knight who was game warden stepped out smiling, his sword drawn. He was not in the least awed by the size and musculature of the youth he faced—a half-

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naked barbarian of some tribe he had never heard of. Besides, he had handled his opponent's sword and knew it was too heavy to be used properly, even by such a big ox. On top of that the barbarian was barely past squiredom, unblooded and with no armor except his steel cap. Hopefully old Oskar Tunghand would stop it before the boy lay dead though. Such size and strength could be trained if he didn't prove too clumsy, and besides, he'd taken a liking to the barbarian's open and honest disposition.

They faced each other. At least the boy showed no fear; his face was calm and his stance easy.

"Fight until I say to stop," the old knight ordered.

Their swords met with a crash and Jens Holgersen began to hew. The youth parried, using sword as much as shield, and the knight was impressed at the ease with which he handled the heavy blade. He increased his efforts and the barbarian backed away, defending himself easily, measuring the strength and skill of the knight. Sword struck on sword and shield.

The man is not too bad, Nils decided, and with that he attacked. The great sword began to fly, smashing the other's sword back, the shocks jarring bone and sinew so that the knight could scarcely recover before the next blow struck. His shield was cloven nearly to the center with a blow that knocked him from his feet, and he lay in the dust, thunderstruck, the point of the great sword touching lightly at the latch of his throat.

"Must I kill him?" Nils asked casually. "He was merciful and spared our lives when he might have hanged us from a tree."

Oskar Tunghand stood erect, his brows knotted in consternation, his right hand on the hilt of his sword, not threateningly but in shock. "No, don't kill him. He"—the words almost choked the old knight—"is one of our best swordsmen."

Nils stepped back, put a foot on the encumbering shield and freed his sword. His wrist relaxed then, the point of his sword in the dust, and Jens Holgersen climbed slowly to his feet, his eyes on the mild young face above him. He saw no exultation there or even satisfaction. The eyes, squinting against the sun, were simply thoughtful. And to the astonishment of the watchers, when Holgersen stood again the young warrior knelt, picked up the knight's fallen sword, handed it to him by the hilt and slid his own back into its scabbard.

"Peder! Take them back to the barracks," Oskar Tunghand said hoarsely. "See that they're fed and properly equipped." He turned to Jens Holgersen. "Come."

Nils and Kuusta had walked several steps with their guide when the old knight's rough voice called. "Hey, you, big one!" Nils stopped and turned. "Your name."

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"Nils Järnhand," Nils answered.

The veteran gazed at him for a moment. "Järnhand." His lips tightened slightly and he turned to walk on with Jens Holgersen.

Nils and Kuusta washed and ate, and an artificer attempted vainly to fit Nils from his supply of mail shirts. "I don't want one anyway," Nils told him. "I'd feel ill at ease in it. Among my people it's the custom for men to go shirtless in warm weather. Would it offend your customs if I go as I am?"

"It's the custom for knights to wear mail while on duty, and Oskar Tunghand has ordered that you be equipped as a knight. And it's the custom of all but peasants to cover their bodies. It's strange that you don't know these things. But, as none of these fit you, I'll have to make one that will. Meanwhile you'd better wear a shirt of some kind, or men will think you're uncouth and lowly."

Peder paa Kvernø, the man-at-arms in whose charge they were, found a woolen shirt that Nils could wear, even if it did not fit. Then Nils found a sharpening steel and began to replace the edge on his sword.

The job was scarcely well started when a page came to take him to an audience. They crossed the dusty courtyard and climbed a flight of stone stairs to enter the great hold, one pikeman preceding them and another following. The corridor was wide, with a tall door at the far end and lesser doors along both sides. The tall door was of thick oak, banded and bossed with iron and guarded by two pikemen. For all its weight it swung easily when the page pushed on it, and they entered a high dim room richly hung with woven cloth. Polished wood glowed in the light that came through narrow windows high in the walls and from oil lamps burning pungently in braziers.

A tall man with a great forked beard sat richly robed upon a throne. To one side stood Oskar Tunghand, with Jens Holgersen behind him in clean hose and jerkin. At his other side stood a white-bearded man, slight but erect in a blue velvet robe, his eyes intent on the newcomer. Behind the throne on either side stood a pikeman.

Nils walked down the carpeted aisle and was stopped five paces from the throne by a pike shaft.

The man on the throne spoke. "Has no one ever taught you to bow?"

"Bow?" Nils asked.

"Like this, dolt," said Oskar Tunghand, and bowed toward the throne. Nils followed his example.

The white-bearded man spoke next. "You are in the presence of his lordship Jørgen Stennaeve, Greve of Jylland, Uniter of the Danes and Scourge of the Frisians. Name yourself."

"I am Nils Järnhand, warrior of

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the Wolf Clan, of the tribe of Svea."

The Greve of Jylland rose abruptly to his feet, his face darkening even in the poor light of the throne room. "Do you joke with me?" he demanded. "There cannot be an Iron Hand in the land of Stone Fist."

"Your lordship?" It was the soft strong voice of white beard again.

"Yes?" snapped the greve.

"The names given by barbarians to barbarians need not concern us. Their names are conceived in ignorance of the world outside their forests and meant without harm to their betters." He turned and gestured toward Nils. "Look at him, your lordship. There is neither guile nor meanness there. Let him be called Nils Savage, for he is a barbarian, and let him serve you. I sense in him a service to your lordship that no one else can render."

Slowly the greve sat down again, and for a moment drummed his big fingers on the arm of his throne. "And you wish to serve me?" he asked at length.

"Yes, your lordship," Nils answered.

Jørgen Stennaeve turned to the white-bearded man. "We can't have a mere man-at-arms who can defeat our best knights; such a man should be instructed in manners and knighted. But I have never heard of knighting foreigners, and especially not barbarians. What do you say, Raadgiver?"

The white-bearded counselor smiled at Nils Järnhand. "What is your rank among your own people?"

"I am a warrior."

"And how did you come to be a warrior?"

"I was chosen in my thirteenth summer and trained for six years as a sword apprentice. Then my hair was braided, I was given my warrior name, and I became a warrior."

Raadgiver turned to the greve. "Your lordship," he said, "it seems that his people, in their barbaric way, have something rather like squires, that they call sword apprentices. And in due course they are made warriors, somewhat equivalent to knights, although uncouth. It is my thought that he need be called neither man-at-arms nor knight, but simply warrior. Let him live in the barracks with the men-at-arms, for he is a barbarian, but let him go into battle among the knights, for that is his training and skill."

A smile actually played around the lips of the grizzled Oskar Tunghand at this construction, and Jørgen Stennaeve, too, looked pleased. The greve rose again. "So be it," he said. "Let Nils Savage, barbarian, remain simply 'warrior,' housed with the men-at-arms but riding with the knights. What do you say to that, warrior?"

"Willingly, your lordship."

"Then return him to the barracks, Tunghand, and have him instructed in his duties."

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V

Outside, dim moonlight filtered through the overcast, but in the hut it was very dark. His senses strained for something, something he could not hear but sensed faintly. His hair crawled. Dogs began to bark. And then there was a sound—a hooting that repeated, deep, toneless, directionless, and repeated again nearer. The barking became shriller and then cut off, and a mindless terror that was not his but that he felt, a paralyzing terror, made some cower in their bed and pull the covers up so that they would not see what was coming for them. And the hooting was very near, in the lane outside, and he saw the door tear from the frame. Something huge and stooped filled the doorway, lurched toward the bed, and he yelled at the figure humped beneath the blankets and yelled . . .

"Nils, wake up, wake up!" And Nils trembling, clawed upright in bed, his heart pounding, eyes wild. "Wake up you fool. You were roaring like a bear."

It was Kuusta, and other men-at-arms stood near looking shocked and angry in their nightclothes.

"My blood what a dream," Nils whispered. "What a dream." He sat clutching a twist of blanket in one huge fist, his breath deep and irregular. "What a terrible dream."

And for the rest of the night his sleep was troubled.

Surprisingly, when he awoke next morning he could remember it clearly, although the terror was only an after-image, a shadow, remembered but not felt. Under Kuusta's coaxing he described it in the barracks, but by daylight it was not especially frightening. Peder paa Kvernø suggested that the fish at supper had seemed a trifle overripe.

Nils and Kuusta sat alone on a bench outside the barracks, digesting their breakfast of porridge and cheese. They talked in Anglic so far as Nils was able, which was considerable, for he grasped syntax almost instinctively, learned readily from context, and never forgot a word he had learned. And when he had trouble, Kuusta helped him. It was known that Jørgen Stennaeve planned to attack Slesvig, Denmark's southern province. Forces would be mustered from all his fiefs as soon as the harvest was over. If he forced the Greve of Slesvig to acknowledge his suzerainty, the Greve of Sjaelland would have to follow and there would be a king again in Denmark.

"They don't prepare very seriously for war," Nils remarked. "At home each warrior has to make his living himself, yet he spends a lot more time practicing with weapons than these knights do. Sword apprentices in their sixteenth summer are more skilled than most knights. No wonder it was so easy for me to beat one of their best. At home even free-

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holders have weapons and practice with birch swords, though more from tradition and in sport than from need. Almost everyone races and wrestles and shoots at marks, and everyone hunts. And children act out famous raids or make up their own. But here the knights and men-at-arms would rather drink or throw dice, and don't practice with weapons nearly enough. Danes may be bold fighters but they are not skilled fighters."

"They're as skilled as those in other lands I've been in," Kuusta replied. "At least the knights are. In most kingdoms all soldiers are knights, and it's mainly the Danish lords who keep men-at-arms, more as police than as soldiers.

"I believe the big differences between these people and ours come partly from the land itself and partly from the laws. At home a man is his own master, to make his living or starve. In Suomi we do not even have thralls. There is all the land and all the game and a man can go as he pleases. He is free, and takes pleasure in contests. But in Suomi we don't have sword apprenticeship or a warrior class as your tribes do, and we don't make so much of raids and war."

"But there's another difference between the tribes and the Danes," Nils pointed out. "Here men can have only one wife, and the sons of knights become knights. And a thrall's son can only be a thrall, unless he runs away to the free towns. But at home a warrior can have three wives, and many sons if he lives long enough. And his sons aren't necessarily chosen to become warriors, while the sons of thralls are chosen fairly often. Our tradition calls it the law of positive selection. And our people increase, and have spread northward below the mountains as far as . . ."

Galloping hooves sounded from the drawbridge, and a constable on a lathered horse pounded through the gate and across the courtyard. Every eye followed him. He dropped from the saddle and ran up the stone steps of the great hold, speaking hurriedly to the guards, one of whom went in with him.

"I wonder what that's all about," Kuusta said, rising. They walked toward the great hold in case anything might be overheard there.

"My dream," Nils said.

"Your dream? What do you mean?"

"It has to do with my dream."

"How could your. . . ? I don't understand what you mean."

"I dreamed of something that happened last night, kilometers away," Nils explained. "That one just brought the report of it."

Before the sun approached midday the troop of mounted men-at-arms were well away from the castle, under the command of a knight with Nils as his second. They had been told only that a

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large and dangerous beast had killed some peasants in a village and that they were to destroy it.

They found the villagers in a state of shock. A family of four had been killed. It wasn't possible to determine how completely they had been eaten; remains had been scattered about with sickening ferocity, inside and out. But the fear among the villagers was out of proportion even to such savagery. Some were fitting stout bars on their doors; a few had fled to the nearby woods; still others only sat and waited for another night to come. The tracks of the beast had been obliterated in the lane through the village, but Nils and Kuusta were experienced trackers and found where the beast had struck the lane. They followed the trail on foot, leading their mounts, the troop following on horseback. Where the tracks crossed a potato field they got a clearer idea of what the animal was like. It walked upright on two oblong feet that were as long as Kuusta's forearm from elbow to knuckles. The toes were somewhat like a man's, but clawed.

"A troll!" said one of the men in an awed voice.

The knight spurred his horse up to the man and almost knocked him from the saddle with a fist blow. "There are no trolls," he snapped, "except in the stories that grandfathers tell." The men sat sullenly. "Who has seen a troll?" he demanded. There was no answer. "Who has even heard of a troll except in fairy tales?"

One of the men laughed. "A troll! My grandmother used to tell me troll stories to make me mind." Others of the men began to smile or laugh.

But when they began to follow the trail again and saw the tracks pressed deeply into the hoed earth, they did not laugh anymore, or even talk.

"What do you think, Nils?" Kuusta asked quietly. "I haven't believed in trolls since I was a little boy, or ever seen or heard evidence of such a thing. But those!" He gestured toward the ground.

"The trolls we heard of as children didn't exist," Nils answered. "They were fairy tales. These tracks and whatever made them are real, and not what the stories were about. But, if anyone wants to call it a troll, it's all the same to me."

The tracks entered a heath and became slow to follow, but they seemed to lead straight toward the sea. So Nils left Kuusta to trail through the low dense shrubs, and mounting, he rode toward the sea with the knight. In less than three kilometers they came to the beach and quickly found where the tracks crossed it into the water. Not twenty meters away they found where they had come out.

"There," said Nils, raising a thick sinewy arm. "That is its

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home." His big calloused forefinger pointed to a small island somewhat more than a kilometer off shore.

"How do you know?" asked the knight.

Nils shrugged.

The knight scowled across the quiet water. "You're probably right," he said. "And before we can get boats enough and go there it'll be dark."

"If we start across he might see us and escape anyway," Nils said. "Or it may be that he's adept enough in the water to attack the boats from below. But he seems to like this place to leave and enter the water. Maybe we could lay behind the dune and ambush him."

The knight divided his troop. Half of them lay wrapped in their blankets back of the seaward dune, trying to sleep, while sentinels watched out to sea from behind clumps of dune grass that dotted the top. The other half, with the horses, took cover behind the next dune inland, ready to come in support if needed, or move parallel to the beach if the monster flanked the ambush.

With the ambush plans the men began to feel more sure of themselves. The beast was big, no question of that, and savage. But most of them had been seasoned in combat and had confidence in themselves. And with bows, pikes, and swords, they assured each other, they would make short work of it.

The moon was at the end of the third quarter and wouldn't rise until midnight. When the last light of dusk faded, the watchers could see little by the starlight. And the gentle washing of waves on the beach could cover the sound of anything emerging from the water.

"I don't like this darkness," the knight grunted softly.

"I don't think he'll come until after the moon rises," Nils answered in a whisper. "Last night the moon was well up before he entered the village. He probably likes more light than this himself."

"How do you know the moon was well up?"

"Because looking through the window I could see the moonlight."

"Oh, yes. I heard about your dream," the knight said. "The story has gone around the castle." He turned to Nils, staring at him in the darkness, and then looked back out to sea. Dimly he could distinguish the dark water from the lighter beach. "I don't believe in dreams," he added.

In spite of themselves they dozed now and then. Suddenly Nils jerked wide awake, startling the knight beside him. The half moon stood above the rim of the sea and the night was light, but it wasn't that that had awakened him. The beast was coming, in the water, with a hunger for flesh and for more than

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flesh; for the current of life, spiced with terror, that was nourishment as necessary to it as food. It felt the buoyancy and resistance and mild coolness of the water. It saw the dunes not far ahead. And it sensed that among the dunes was what it sought.

Nils shook his head and looked about him with his own eyes again. "He's coming," he whispered softly, "and he knows we're here."

The knight said nothing, but rose to one elbow and stared out to sea.

"It's not in sight yet," Nils said, "but it will be soon." He slid down the back side of the dune and began waking the sleepers one by one, with a touch and a whisper. They rolled out of their blankets, awake and tense, and followed Nils to the crest.

Nils sensed the knight's rigidity and looked seaward. The beast could be seen now, twenty or thirty meters from the shore, wading slowly in the shallow water. It looked immense, perhaps three meters tall. Its proportions resembled those of an overgrown gorilla except that it was longer legged. But its hide, wet and moonlit, looked like chain mail.

It stopped for a moment where the waves washed onto the beach, turned its head briefly to look back at the moon, and then scanned the dune. An overanxious bowman loosed an arrow and a hail of others hissed after it, to fall from the beast's hide onto the sand. For just an instant it stood, shielding its face with a massive forearm. Then a line of shouting men charged from the crest, brandishing pikes and swords.

A hoarse hoot came from the beast, and something else. A great wave of something. Men staggered, dropped their weapons, and war cries changed to howls and shrieks of mindless terror. Some ran, stumbling, rising, back up the dune, or along the beach, or into the sea. Others simply fell, wrapping their arms around their heads in catatonic helplessness.

Nils felt the waves of terror as on the night before, terror that was not his own but shook him momentarily nonetheless. The few arrows that had stuck in the beast dangled as if only the points had penetrated. He picked up a pike and charged down the dune again, the only one now, bulging arms cocked, and at three meters lunged with all his strength at the towering monster, his hands near the butt of the pike, and felt the head strike and break through. His follow-through carried him rolling onto the sand, diagonally and almost into the legs of the beast, the hilt of his scabbarded sword striking him painfully below the ribs. He rolled to his feet, stumbling as the beast rushed at him, bulky but quick, the pike shaft sticking out of its belly. There was only time to grab the shaft before the beast was on him.

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The charge threw Nils backward, off his feet, sliding on his back across the sand, his grip like iron on the shaft, his arms and shoulders tensed with all their strength. Great clawed fingers clutched short of him and the hoot changed to a roar of rage as the beast dropped to its knees. When the pike had pierced its entrails the pain had been like a stab of fire. But the collision, with the man grabbing the shaft, and the shock as he had hit the ground, transmitted through two and a half meters of strong ash, did terrible damage.

Nils let go and rolled sideways to his feet, drawing his sword as the beast rose again. It wrenched the pike from its guts, eyes raging, and charged once more. The sword struck once, down into the rib cage, and they crashed to the ground together. One great forearm pressed down on Nils's throat and he grabbed desperately at the scaly neck, straining to keep its fangs from him. His last thought, fading but distinct, was that its blood smelled like any other.

VI

Consciousness came gradually. First Nils was aware of his body and then of voices. After a bit he focused on the voices, and their Anglic began to take meaning.

"So we have a psi who is also deadly," the female voice was saying. "But, tell me, why does it have to be a filthy ignorant barbarian?"

Nils opened his eyes.

Raadgiver, in his blue velvet robe, sat beside the cot, looking down at Nils and smiling slightly. A young woman, taller than the counselor, stood at the window looking out, her black hair in a braid down her slender back.

"Signe, our patient is awake," Raadgiver said in Danish. He pulled on a cord and somewhere a bell rang. Signe turned. She was not much more than a girl—perhaps no older than Nils—and handsome, but her startling blue eyes bespoke dislike.

"Nils Savage, this is my daughter and apprentice. I need not introduce you to her, for she has shared the job of watching over you since you were brought to the castle earlier this morning. I have been your other nurse."

Nils sat up on the edge of the cot thoughtfully. He wore only his breeches. His other things lay on a nearby bench. "I don't seem to be injured, only weak," he said. "The troll must have died almost as soon as I lost consciousness."

"Troll!" said Signe, turning to her father without trying to hide her scorn of such superstition.

"Do you believe it was a troll, Nils?" asked Raadgiver.

"Not in the sense of the fairy tales," he answered. "But it is useful to have a name to call it. It's not an animal from this part of the world, for otherwise we would

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know of it, and not by grandfathers' tales but by its deed and attributes.

"Brave men who saw it and what it had done were not terrified by the sight. They believed they could kill it. But when they attacked, it filled them with terror, and their minds were like eyes that had looked at the sun. And it wasn't the howl that did it, at least not by itself. If I made the same sound no one would panic."

Nils looked calmly up from his seat on the cot. "And I could see through its eyes and knew it was coming, before it was seen or heard."

"And why didn't you panic?" Raadgiver asked. "You were the only one that didn't, you know. Did you feel no fear?"

"I felt the fear all right," Nils replied, "but it wasn't my own. I believe that somehow it was from the others as well as from the troll. It was like a wave washing over me without wetting me."

There was a rap on the heavy door of the chamber, and Raadgiver spoke. A servant entered and left a platter with a steaming roast, mushrooms, a loaf and a large mug.

"Well," Raadgiver said, "we'll leave you with this, for we have eaten, and will return when you have finished." He held the door for Signe, at the same time turning again to Nils. "Do you speak Anglic, Nils?" he asked.

"Some," Nils answered. "I've been learning it for several weeks."

Raadgiver almost grinned for a moment, and nudged his daughter as the door closed behind them. "I believe your 'filthy ignorant barbarian' heard and understood that little remark just before he opened his eyes," he thought to her. "And what do you think of him now, my dear? He is hardly more than a boy but he has a mind like a razor."

Signe's answer was a flash of irritation.

Nils chewed the end of the loaf, which held all that was left of the gravy, then tipped the last of the ale from the mug and wiped his mouth on the back of a thick hand. Standing, he pulled the bell cord and walked to the narrow window. The thick stone walls restricted the viewing angle, but the room was high and he could see over the castle wall. The patchwork of fields and woods, so different from the endless forests, bogs and lakes of Svea, lay peaceful and warm in the sunshine of an August afternoon.

He did not turn when a servant entered and took out the platter. A moment later Raadgiver and Signe returned.

Without preliminaries Nils asked, "What is it you want me to do?"

"Why do you think we want you to do anything?" Raadgiver countered.

Nils, leaning casually against the

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wall, said nothing, simply folding his muscular arms across his chest.

Raadgiver laughed suddenly and addressed his daughter out loud. "My dear, this would be the man we need even if he wasn't a psi. If I praise him, he won't be embarrassed because he'll know it is merely true. And, if you insult him, he won't be irritated because it won't matter to him, being untrue. I have sought to know satori since before he was born and do not know it yet. But he knows it, or something very like it, without ever having heard of it.

"And besides, I cannot read his thoughts except when he speaks."

Raadgiver lowered himself into a cushioned chair and looked up at Nils more seriously now. "Do you know the word 'psi'?"

"No."

"Psi is the ability to read minds, to converse silently, or to look into the future. Very few can do these things. Small children with the potential to learn them aren't rare, but in most cases the potential is lost if it isn't developed by the fifth or sixth year. Among the occasional adults who retain it, it is almost always erratic and usually weak, unless trained."

"I've had that sort of experience only twice," Nils said. "In my dream two nights ago when my mind was in the peasant hut, and last night when the troll was swimming from the island."

"Only twice strongly," Raadgiver corrected, "but perhaps many other times less obviously. I read the minds of those who were at your audience with the greve. You had handed Jens Holgersen his sword after beating him and then you sheathed your own. Wasn't that reckless? He could easily have killed you then, and many men would have. Yet bravado and foolishness are as foreign to your nature as weakness is."

"I knew he wouldn't," said Nils.

"But how could you be so sure? You didn't know him well," Raadgiver pointed out. "When we say that an untrained psi shows erratic ability, we refer to conscious psi experience. Most such people, or probably all, receive many other psi impressions unconsciously—that is, psi messages enter minds but they do not recognize them for what they are. But the information is in their minds anyway. That is—" He paused. "It's very hard to explain to someone who has no concept of the subconscious mind."

"I understand you," Nils said.

Raadgiver leaned back in his chair, his intensity suddenly gone. "Of course," he said. "You would."

"And now, back to my question," Nils reminded him.

"Ah, yes. What we want you to do. We are working up to that." Raadgiver shifted in his seat, looking tired now, and began to speak quietly. "What is the most important thing to man, next to life itself?"

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"What he really believes is true."

"That is only so if he's not suffering," Raadgiver countered. "If he is suffering enough, the most important thing is for the suffering to end. If he lives in constant fear —fear of terrible pain, of the real and imminent threat of physical and mental torture—then the most important thing becomes freedom from that threat."

Nils had never heard of such a situation, nor imagined it. He listened intently.

"Now suppose there was a land in which all men were thralls," Raadgiver continued, "except for one master and his soldiers. And suppose that master had the worst kind of madness, finding his greatest pleasure in the misery and degradation, the torture, of his thralls. An emperor who conquered only to enjoy the cries, the whimpers, the begging for mercy of those he ruled. A man who had lived very long and has a great army." Raadgiver leaned toward Nils. "What would you do if you lived in a land like that?"

"I don't know," Nils answered. "I have never thought of such a thing. It would depend on the possibilities."

"But suppose that lord offered to make you his lieutenant?" Raadgiver asked.

"I expect that lieutenant would still be his thrall," Nils said. "Where is that land?"

"Now it is far to the southeast," Raadgiver answered, "but someday, perhaps soon, it may include all of Europe, even Denmark.

"And what we want you to do is kill that man."

VII

Jørgen Stennaeve was tough, ambitious, and direct, but not particularly intelligent. Given cause for distrust he could be extremely wary, but otherwise he tended to take things at face value, and was also disinterested in details. So when his chief counselor asked for charge of the barbarian, he asked few questions. Raadgiver simply explained that he believed the troll was sent by an evil power in a distant land. That evil power hoped someday to spread into Europe, even to Denmark. Nils withstood the troll because of a certain strength against that power, he went on, and Raadgiver wanted to train him and send him to fight it.

To the greve the menace seemed remote and the value of such a fighting man might be considerable in the impending invasion of Slesvig. But on the other hand the counselor's advice was almost always good, so he agreed to the request. Thus Nils moved from the barracks to a small chamber near the apartment of Raadgiver and Signe, and began his lessons. Raadgiver instructed him, or Signe when her father was otherwise occupied.

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Most psi experiences are telepathy, Nils was told. Psis can read thoughts only when there are explicit thoughts to read—that is, when the mind is discursive—and psi conversation consists primarily of thinking words, feelings, and pictures to one another. When the attention is on some sensory experience, that experience, too, can be shared, as when Nils looked at the beach through the troll's eyes and felt the water with its body.

Emotional states, including the finer nuances, are easily sensed, and a psi commonly receives a general but appropriate reading of overall personality at first encounter.

Psionic transmissions normally are subject to the inverse square law, but can be received at something beyond hearing distance, especially when transmitted "forcefully." With training, the potentially psi-receptive mind reflexively develops selective damping, providing a large degree of protection against "psi noise." Damping can be cut selectively for screening transmissions, as for seeking one particular mind in a crowd. And when that mind is found, the attention can be focused on it while reception of others remains damped.

Damping is not very effective against transmissions directed specifically toward the receiver, however.

Unexplainable exceptions occur to the inverse square limitation. Occasional transmissions carry thousands of kilometers without apparent weakening. These are highly specific to a receiver or receivers, and the receiver need not be a trained psi. Little is known about this phenomenon and such transmissions cannot be made at will. Therefore they are of little importance.

There is also a technological exception to the inverse square restriction. Before the Great Death an instrument called a psi tuner was invented permitting the narrow focusing of telepathic transmissions to another psi tuner. They are useful only to trained psis.

Precognition and premonition are the other known facets of psi. In the untrained psi these commonly are in the form of symbolic visions, but among trained psis they usually are explicit previews having the same quality and impact as a sensory perception. Premonitions are not necessarily fulfilled, falling into the category of "what will happen if nothing intercedes." Precognition, on the other hand, seems to fall into the category of "what will happen regardless." Trained psis sense the distinction. A strong philosophical case has been made, however, for the contention that there is no precognition in that strict sense, the difference between the experiences lying in the degree of probability that they will be fulfilled.

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Premonition and precognition also cannot be experienced at will. They occur rarely or possibly never at all to some psis, infrequently to most, and somewhat frequently to a few. Commonly occurring without context, the receiver often cannot understand what he "saw," and the event foreseen may be important or irrelevant to him.

Raadgiver also described the loose organization of psis that had grown up in Europe.

"In the year 2105 there were four billion people on Earth," he said. "Can you imagine that, Nils? That is a thousand taken a thousand times, and then that thousand thousand a thousand times again, and four times all those. It is beyond our comprehension. Single towns had more people than all the world today, we are told. That is our tradition. And then the Great Death came and within a few weeks so many had died that a man could walk for days before he saw another living person.

"The ancients had great learning and made great machines. Machines pumped water into every home through iron tubes, even to the tops of towers. People rode in flying ships faster than sound, and even to the stars, which are other worlds like this one. Subtle machines did their labor, drawing power from beams like sunlight but that were invisible and akin to lightning. But each machine needed men with special skills to take care of it, and it had to be told what to do. And when the men died the machines began to die. And when the machines died that made the power beams, almost all the others died at once.

"And the people with the plague were seized with the desire to set fires, as a man with a cold must cough or sneeze. The few who survived found the world a smoking ruin.

"At one time they hoped that those who'd gone to the stars would come back someday, but they never did, and it is probable that the plague struck them, too.

"One who survived was a trained psi named Jakob Tashi Norbu, who taught in a great place of learning called the University of Lucerne. In those days there was a powder that could be given to a person to tell whether or not he had psi potential, and he searched on foot through Europe looking for psis. He found three. He also searched the places of learning for psi tuners and found fourteen. Mine is one of them.

"Father Jakob taught each of his psis and gave them psi tuners. They took mates and most of the children were psis. That was the beginning of the Alliance.

"Over the generations men's numbers increased, and lords and chiefs appeared. So the Alliance dispersed. It was becoming unsafe to be a separate community. Fourteen had psi tuners, and these

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worked themselves into the service of lords and chiefs, as advisers. They kept their talents secret, and used them to advance good lords or cause the fall of bad. Within the Alliance, those with psi tuners are called the Inner Circle. Over the centuries the Inner Circle has had an important influence on the ascension and the acts of rulers.

"Some without tuners also are advisers, and in most important towns there is at least one free merchant who is a psi. These we call the kinfolk, and some of us refer to the whole Alliance as the kinfolk. And they, too, keep their talents a secret.

"Others have become wanderers. We call them the wandering kin, but the peasants call them the Brethren. They wander through the countryside and among the villages as storytellers, teachers, and magicians, speaking Anglic almost exclusively. This helps keep Anglic alive so that men of different countries can speak with each other. They awe the people by knowing their secrets, and use their skills to seem supernatural. When available, the peasants call upon them to judge disputes. Their stories become traditions and their acts legends, and so far as their understanding and ability allows they try to reduce the cruelty and injustice that men perpetrate on men.

"The wandering kin have their own tradition. They own nothing but the clothes they wear and a sleeping robe for when they must spend the night beside the road. The peasants feed and shelter them and give them clothes, regarding it a privilege. Only in unpeopled stretches do the wandering kin own even a hut, where they can shelter in bad weather."

Raadgiver also described how psis influence the thinking of nonpsis. A psi cannot influence a subject to a conclusion or action incompatible with the subject's nature. But his reaction to a specific idea, or event, commonly can be modified. For example, the influence of a psi adviser on his feudal lord depends on:

1. Selection of a lord who is not particularly suspicious of him nor averse to advice, followed by cultivation of the lord's confidence.

2. Sound insight into the lord's personality. An important element in psi training is learning to interpret thoughts and emotions and to integrate them into a reasonable model of the subject's subconscious so that his reactions can be predicted.

3. Correct reading of the lord's mood of the moment, which is automatic for the trained psi.

4. Ability to translate the psi's objective, or an approximation of it, into an objective harmonic with the lord's tastes or at least compatible to them.

Nils also was instructed in geog-

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raphy, map reading, and use of the psi tuner. Raadgiver also passed on odd bits and pieces of subjects from philosophy to geology. So far as possible, instruction and conversation were in Anglic.

The man Nils was to assassinate was a psi named Kazi. The Alliance had first become aware of him several decades earlier, as the ruler of a powerful near-eastern despotism. One of the kinfolk, equipped with a psi tuner, had been sent to spy on him and was captured. Apparently he succeeded in suicide however, for Kazi seemed to have gotten little information from him. But he clearly deduced the existence of a European psi organization. For a time Kazi had sent psi spies of his own into Europe, losing several but assassinating three of the Inner Circle. Apparently he concluded that so loose and nonmilitary an organization as the Alliance was no threat to him, for no more spies had been detected for a number of years.

Meanwhile Kazi had expanded his empire to include much of the Balkans.

Reports and rumors gathered by wandering kin in peripheral areas and from refugees, indicated that Kazi's rule was one of deliberate depravity, and that he was clearly psychopathic. His subjects lived in a pathetic state of fear, and his army was thought to be invincible.

Legends described him as the Never Dying. Evidence indicated that he actually was either ageless, extremely old, or more probably a dynasty.

Apparently he intended to conquer Europe. He had planted a cult to Baalzebub throughout much of the continent, Baalzebub referring to himself. Under the influence of drugs, members practiced such obscene depravities that they felt themselves totally alienated from their culture, and either dedicated themselves completely to the cult or committed suicide.

It had few adherents now, however. Initiates were easily detected by the kinfolk, and using the information they provided, the feudal lords had suppressed the cult harshly. And the wandering kin preached against it.

Recently trolls had appeared along the coast of western and northern Europe, and the rumor had been spread that these were Baalzebub's punishment because the people did not worship him.

The Alliance had been looking for someone who might stand a chance of assassinating Kazi. Raadgiver told Nils frankly that success seemed unlikely, so that there was almost no hope of stopping Kazi.

Nils left the castle in the dry haze of an October day, alone.

"After two months you still dislike him, Signe," Raadgiver thought. "Shall I tell you why?"

"He has no sensitivities." Signe answered aloud.

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"You mean he doesn't think as we do nor feel the same emotions. I sensed that in him when I first saw him, at his audience with the greve. He didn't think discursively except when he spoke. His mind receives, correlates, and decides, but it does not 'think to itself.'

"Because of that difference, you dislike him, yet if we weren't so different ourselves we wouldn't know it. Everyone else at the castle likes him because he is mild and pleasant.

"Signe, we are told that before the Great Death, when psi was not secret, many people hated psis. And not because of the ways they acted or the things they said, but because psis were so different, and in a way superior.

"Nils is still another kind of human, different, and in important ways superior to us. It bothers you to hear it said, doesn't it? And you sensed that superiority at once, and watched it grow.

"Yet we have our part in it, for without us it would not have matured. His mind was impressive from the first, but its scope has broadened and deepened greatly during his weeks with us, and as he absorbs experiences through psi . . ."

Signe's thought interrupted his angrily. "And he is not even grateful!" she flared.

"True, he isn't. He knows what happened, what we did, and accepts it as a matter of fact. That's his nature. And it seems to be yours to dislike him for it. But remember this when you're enjoying the questionable pleasure of indignation. At your request he is going to probable death, without question or hesitation. And who else would have a significant chance of success?"

VIII

During his training under Raadgiver, Nils worked out for a time each morning, mostly giving Kuusta lessons in the use of sword and shield. Kuusta already knew the basics and was strong for his size. Also he was a result of many generations in a harshly selective wilderness, and had grown up a hunter with hunger, or a full belly, as the stakes. The combination had given sharp senses and excellent reflexes. By late September Kuusta had more than thickened in the arms and shoulders; he had become one of the best swordsmen among the men-at-arms, and afoot could have held his own against some of the knights.

Generally however, the life of a man-at-arms had palled on Kuusta Suomalainen. First, it was dull. Under the gentle influence of his chief counselor, the Greve of Slesvig had been sufficiently impressed by the mobilization of Jylland forces to offer homage to Jørgen Stennaeve as King of Denmark. So there was no war. Sec-

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ondly; Kuusta was homesick. He had compared the wide world with Finland and found the wide world lacking.

Jens Holgersen had appreciated his woods cunning and assigned him to night patrol for poachers, which had been pleasant enough until the evening they caught a peasant with a deer.

His main satisfaction was in training with Nils, sweating, aching, and feeling the growth of his skill and strength. So when Nils told him that he soon would be leaving, alone, Kuusta also began to think about leaving, and with Raadgiver's influence he was released from his service.

On the evening before Kuusta was to leave, he sat with Nils outside the castle, by the moat. "Why have you decided to go home instead of searching for the esper crystal?" Nils asked. He knew Kuusta's mind but asked by way of conversation.

"The esper crystal?" Kuusta grunted. "It seemed real and important enough to me once, but now I'd rather see Suomi again. I want to hunt, sweat in the sauna, and speak my own language, in a land where men are not hanged up with their eyes bulging and their tongue swelling while they slowly choke to death. And all because they wanted some meat with their porridge."

"And how will you get there?" Nils asked.

"I've seen a map showing that if I ride eastward far enough I'll come to the end of the sea, and if I go around the end I'll come to Suomi."

"And do you know what the people are like in the lands you'll pass through?"

Kuusta shrugged. "Like the people in most lands, I suppose. But being obviously poor and riding a horse well past its prime, I won't be overly tempting to them. And since you've treated me so mercilessly on the drill field, I'll be less susceptible to them. Actually, if the truth was known, I'm leaving to escape those morning sessions with you, but I don't want to tell you that straight out because even the ignorant have feelings."

"Well, it's nice to have a friend so thoughtful of me," Nils responded, "because we fully grown people are as sensitive as midgets."

Kuusta aimed a fist to miss the blond head next to him, and Nils dodged exaggeratedly, rolling away to one side. Then they got up, went back into the castle, and shook hands in parting.

Early the next morning Kuusta Suomalainen rode across the drawbridge on the aging horse his soldier's pay had bought him, with a sword at his side, a small saddle bag tied behind, and a safe-pass signed by Oskar Tunghand.

It was an October day on a forested plain in northern Poland,

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sunny but cool, with a fair breeze rattling the yellow leaves in the aspens and sending flurries of them filtering down to carpet the narrow road. But Kuusta was not enjoying the beauty. Periodically he broke into coughing that bent him over the horse's withers and left him so weak that he didn't see the man standing in the road facing him until the horse drew up nervously. The man wore a cowled jacket of faded dark green homespun and carried a staff over one shoulder. His face approached the brown of a ripe horse chestnut, in striking contrast to the shock of straw-colored hair that looked to have been cut under a bowl.

"Good morning," the man said cheerfully in Anglic. "You sound terrible."

Kuusta looked at him, too sick to be surprised at having been greeted in other than Polish.

"Where are you going in such poor shape?" the man asked.

"To Finland," Kuusta answered dully.

"Let me put it another way," the man said. "Where are you going today? Because wherever it is, unless it's very nearby you'll never make it. I've just come from a shelter of the Brethren, very near here and, if you're willing, I'll take you there." He paused. "My name is Brother Jozef."

Kuusta simply nodded acquiescence, while staring at the horse's neck.

The shelter was out of sight of the road, the path leading there being marked by a cross hacked in the bark of a roadside tree. It was built of unsquared logs and had two rooms,, a small one for occupancy and a smaller one for storage and dry firewood.

Jozef helped Kuusta from the horse and through the door. Inside it was dark, for he had closed the shutters earlier before leaving, but he knew his way around and led Kuusta to a shelflike bed with a grass-filled ticking on it, built against the wall. Then he disappeared outside. As Kuusta's eyes adjusted to the gloom he raised himself on one elbow to look around. A fit of coughing seized him, deep and bronchial, and he fell back gasping. He began to shiver violently, and when Jozef came back in he put down his armload of firewood and covered Kuusta with the sleeping robe from the saddle bag and then with another ticking from the storeroom.

In the night Kuusta's moans awakened the Pole. The Finn's body tossed and twisted feverishly in the darkness, his mind watching a battle. Jozef could see hundreds of knights on a prairie, fleeing in broken groups toward a forest. Pursuing them was a horde of wild horsemen wearing mail and black pigtails, cutting down stragglers. Then a phalanx of knights appeared from the forest, led by the flag of Casimir, King of Poland.

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They launched themselves at the strung out body of pigtailed horsemen who abandoned their pursuit and tried to form themselves against the challenge. In moments the charging knights struck, sweeping many of them away, and they broke into groups of battling horsemen chopping and sweating and dying on the grassland.

Kuusta sat up with a hoarse cry, and the scene was gone. Slowly he lay back, his mind settling again into feverish sleep, only ripples and twitches remaining of the violent disturbance of a moment before.

But Brother Jozef sat awake, staring unseeingly at the glow showing through the joints in the box stove. To his trained psi mind the difference between the pickup of a dream and of a quasi-optical precognition was definite and unmistakable. This traveler was an undeveloped psi.

IX

The weather had been almost continually pleasant during Nils's journey, but on this late October day the sky was threatening. Earlier in the morning he had left a rolling district of farms and woods for wild rocky hills, and the valley had narrowed to a canyon that pinched the road between steep fir-clad slopes.

The first pickup he had of the ambush was the mental response of the robbers when they heard his horse's hooves clop over a cobbly stretch where the brook turned across the road.

He stopped for a brief moment. There seemed to be five of them, perhaps seventy or eighty meters ahead, but they couldn't see him yet. He slid from the saddle with bow, sword, and shield, slapped the horse on the rump, and moved into the thick forest, slipping quietly along the slope above the road while the horse jogged toward the ambush.

He heard shouts ahead and moved on until, through a screen of trees, he could see what had happened. Apparently the horse had shied and tried to avoid capture, for they had shot it and were tying his gear onto one of the three horses that the five shared. Quickly he drew his bow and shot an arrow, and another, and another, two of the robbers falling while the other three scrambled onto the horses and galloped away. His third arrow had glanced from a sapling branch.

His horse lay still alive, four arrows in its body. He knelt beside the outstretched neck, cut its throat, and caught his steel cap full of the gushing blood. After he had had his fill he washed the cap in the brook.

Then he searched the bodies. It was clear that robbers weren't prospering in Bavaria. These two didn't even have the flint and steel he was looking for. He cut a long

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strip of flesh from his horse's flank, put it inside his jacket, and started walking down the road. A few big wet snowflakes started to drift down. In less than half a kilometer they were falling so thickly that the ground's warmth couldn't melt them as fast as they landed, and it began to whiten. Within a kilometer visibility had dropped to a few score meters. The temperature was falling, too, and soon the snow was no longer wet and sticky. By the time Nils had crossed a low pass and started into the next forested valley the snow was almost halfway to his knees.

These wild hills were now a narrow range between two farming districts, and by late afternoon he still had not come to shelter. The snow was thigh deep and showed no sign of slowing, while the temperature was still edging downward. Under the denser groves of old firs the snow was much less deep, piling thickly on the branches. His sword striking rapidly, Nils cut a number of shaggy fir saplings and dragged them under a dense group of veterans, building a ridge-roofed shelter hardly waist high. Next he stripped a number of others, stuffing the shelter almost full of their boughs and piling more at the entrance. Then, with his shield, he threw a thick layer of snow over it. Finally he burrowed into the bough-filled interior feet first, stuffed the entrance full of boughs in front of him, and soon was dozing chilled and fitful.

By dark the entrance, too, was buried under snow.

Through the night he was dimly aware of time and of being cold, never deeply asleep, never wide awake. Later he was aware of dim light diffusing through the snow, that marked the coming of day, but with the instinct of a boar bear he knew it was still storming. Twice he wakened enough to eat some of the raw horse meat, and later he knew that darkness had returned, and still again that it was daylight.

Nils sensed now that the storm was over, and he was stiff with cold. Burrowing out of the shelter he stood erect. The snow was chest deep under the old firs and deeper elsewhere. The sky was clear, and the hairs in his nostrils stiffened at once with the frost. With his sword he cut two small fir saplings, trimmed them on two sides, and with fingers clumsy from cold tied them to his boots with leather strips from his jacket. On these makeshift snowshoes he started up the road again.

Moisture from his breath formed frost beads on his lashes and caked his fledgling moustache and beard. Although it was awkward, he walked with his gloveless hands inside his jacket, his fingers under his arms. His thighs soon ached with cold. He was dressed only for a raw

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autumn day, not for a polar air mass.

Hours passed. Hours that would have killed most men.

Nils felt the cold as a physical-physiological phenomenon, and knew that after a time it would damage his body severely, or even lethally if he did not find shelter soon enough. The cold would be much less severe if he sheltered under the snow again, but the constant chill would seriously deplete his energy reserves without bringing him nearer to safety. Dressed as he was, to hole up again would delay death but it would also assure it.

With each step he had to raise his feet high to clear the clumsy snowshoes from the deep fluffy snow, and as the kilometer passed, his strides became gradually slower and shorter. His feet were like wood, his hands numb and useless, and his body had stopped feeling the cold. The sun set and he crossed another ridge in the growing darkness. He was not consciously aware of it when night fell.

Suddenly he became alert, smelling distant smoke, sensing the direction of the faint air movement. Moving slowly he turned from the road, plowing deep furrows as he went. Soon he sensed a mind, dimly, felt it sense his.

The hut was a kilometer from the road—a hump in the snow with the door partly cleared. Other eyes saw the door through his, and as he dragged toward it, it opened. A tall woman stepped out with a long knife, cut the snowshoes from his feet, and helped him inside.

Nils awoke rested and utterly famished. He knew his hands and feet should have been swollen and split and painful, but they weren't. The skin was peeling from them, and from his face and the front of his thighs, but they didn't seem really damaged. The woman pulled back the covers and let him look at himself through her eyes.

"My name is Nils," he thought. "What is yours?"

"Ilse," she answered, adding, "you have been here three nights and two days."

"How did you do it?" he asked, thinking of the hands and feet that should have been gangrenous but weren't.

"Through your sleeping mind."

"How?"

"I spoke to it, leading it, and your mind led your flesh to make new flesh in the layers that were dying. My father taught me how."

Ilse's father had been one of the merchant kinfolk, she explained, who had sensed powers in himself that the kinfolk did not know about. So he had taken his wife and little daughter into the quiet of the wilderness, to meditate, while his eldest son took his place as a merchant, and subtle force, in the free town of Neudorf am Donau. A younger son had joined the wandering kin.

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Ilse had grown up in the forest, a curious and sensitive child, free of the psi static that most psi children grew up with in towns. So she sensed the minds of animals. In most of them there was little enough to read—anxiety, desire, curiosity, anger, comfort and discomfort, all transient. It was a background to her days, like the breeze in the treetops.

"And then," she thought to Nils, "one day I reached out and touched the mind of an old he-wolf, and he felt the touch. For wolves have psi. If one is born without it, they kill it so that it will not suffer the handicap. They confer silently, using their voices only as an accompaniment. Next to man they are by far the most intelligent animals in the hills, and they compensate for the sense, but the emotion simply happens, without building on itself. They feel fondness but never sentiment. When a wolf fears, it is a fear of something real and present, a response to an immediate danger, and he looks at it as he looks at hunger, or a tree, or a rabbit. It is there, a fact of life, and he acts accordingly, without confusion." Ilse looked at Nils in the dim light filtering through the deer skins stretched over the windows. "In many ways the minds of wolves are like yours," she added.

"I am the first human the wolves have ever shared minds with, at least in this forest, and we have done so many times. We communicate by mind pictures, to which we give emotional content, and have developed a considerable subtlety. It's pleasant for them and for me, too. Through them I have run through the snow with starlight glittering it, and have felt their joy in a warm scent. From me they sense new ideas, unthought-of concepts, and while they understand them only vaguely it gives them a sense of mind-filling, like the feeling they get when they look at a clear night sky and sense a whole universe beyond understanding.

"So I've always been safe when wolves are about, and if possible they would protect me if I was threatened."

Ilse rose from a bench and took furs from a box—clothing and a sleeping bag, all large. "These are yours when you leave. Your skis are outside."

Nils's mind questioned.

"Yes, I had a premonition a year ago. After a great storm you would come here, unless you were killed earlier, weak and frozen and unequipped for winter. And there was more. You will go to the great town called Pest, and serve Janos, king of the Magyars."

Nils stayed with Ilse for several days, resting and learning.

X

During the days since he had left Ilse the arctic cold had eased a great deal but winter still held

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strong. The snow had settled some but there had been no thawing. He had passed through inhabited districts again. Peasants were out on skis, with their oxen and sleighs, hauling firewood, or the bodies of cattle that had died in the storm. In Anglic they told him glumly that the cattle would be on short rations by spring, for they usually were able to browse in the woods until near the solstice but now were eating their hay already. And the cold they had had was rare even in the middle of winter.

By February, the peasants added, the wolves would be ravenous, and a man would not dare go far from his village alone.

Nils still had some Danish coins in his money belt, and stayed twice at inns, where he was warned that the Magyars did not like foreigners, that most of them did not speak Anglic, and that travelers in their land sometimes were badly used.

At length he crossed a range of high rugged mountains and skied out onto a broad plain, mostly treeless, that he had been told marked the beginning of the land of the Magyars. The mountains had shielded it from the worst of the storm, and men were able to move about on horseback through the four decimeters of wind-packed snow. As he was crossing a frozen river he saw several mounted men riding along the high bank opposite him. They stopped to watch, and as he drew nearer he saw that they carried lances. Suddenly one of them urged his horse down the bank and the others followed, charging toward Nils. The wind-pack allowed them to run their horses at a full gallop on the ice, and the leader dipped his lance as if to skewer the trespasser. Nils stood calmly without unslinging his bow, or drawing his sword. At the last moment the rider swerved past him, his horse's hooves throwing snow on Nils, his left knee almost touching Nils. The others drew up in front of the northman while the leader pulled his mount around tightly and circled, looking down at him with eyes squinted against the snow glare. He spoke in a language unlike any Nils had heard and which he assumed was Magyar. Getting no answer, the man spoke again in what Nils recognized as German. Answering in Anglic, Nils said, "I am a mercenary who has come to seek service with King Janos of the Magyars."

The horsemen looked at one another, talking in Magyar. Nils sensed that none had understood him. Speaking slowly and deliberately he said, "Janos. King Janos. I come to serve Janos."

The leader scowled grotesquely at that and Nils sensed his irritation. He spoke rapidly to his men, and one of them reached down to prod the northman with his lance and then to gesture toward the bank they had come from. They made way for him and he started

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toward it, two falling in behind while the others trotted their horses toward the point at which he had first seen them, and disappeared.

They marched him for an hour and a half before he saw the large castle on the open rolling plain. He was taken to the guard room, where a man who was clearly an officer looked up at him and spoke to his captors in Magyar. Then, in Anglic, he asked, "Where are you from?"

"From Svea."

The officer snorted. "I have never heard of it," he said, as if that disposed of Svea. "What have you come here for,"

"I heard of a king called Janos, and have come to seek service with him."

Before he had completed the statement Nils sensed that it would bring him trouble. "Janos, eh, This is the land of Lord Lajos Nagy, and there is no love here for the tyrant Janos." With that he snapped a sharp command in Magyar, and one of Nils's captors pressed a sword in his back while a guard came forward with manacles.

The dungeon was simply a long spiral staircase that wound its way down underground. Instead of cells it had open alcoves where prisoners could be chained to the wall by an ankle, a wrist, and the neck. They passed no prisoners as they went down, but from where he was chained Nils could sense others below. The only light came from smoky oil lamps, one of which was bracketed to the stone wall opposite each alcove.

The guard, who brought him his evening gruel, carried a cat-o'-nine-tails in one hand, its leather thong looped about his wrist. Carefully he sized up the new prisoner and took pains to come no nearer than necessary, putting the bowl down where Nils had to stretch for it. As soon as he turned his back Nils threw the hot gruel on him. Reflexively the guard whirled, cursing loudly and lashing at him. Nils grabbed the whirring knout and jerked, the loop around the guard's wrist pulling him within reach of Nils's chained hand. Strongly, though briefly, the guard struggled, but did not cry out.

He had no key. Still chained, Nils took his cap, harness, short sword and cloak, tore strips from the bottom of the cloak, and tied the corpse's arms and doubled legs against his torso. Then, one-handed, he threw the corpse down the steep stairs as hard as he could, listening with satisfaction to its bouncing descent. Next he put the cap on his head, draped the cloak over his shoulders, and squatted waiting.

After some time the screech of hinges sounded faintly down the stone stairwell, and a voice called down questioningly. Nils huddled against the wall as if in pain, knees, one elbow, and head on the stone floor, the the short sword in his free hand concealed by his cloak, try-

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ing to look like a sick or injured guard in the semidarkness, watching through slitted eyes. Within a few moments two guards appeared around a turn just above him, the first carrying a torch in one hand, both with short swords drawn. They were scanning the stairs ahead of them and might have passed entirely without seeing him.

Nils groaned softly as the second guard was passing the alcove. The man stopped and stared at him, then stepped in, bending, and blocking the light. Quickly Nils raised his body, grabbing the guard's cloak and plunging the short sword into his abdomen and chest. For a moment he held the sagging form upright, letting go his sword to do it. The other guard sensed that something was wrong and moved into the alcove to see. Nils let the body collapse, reached out from beneath it with his manacled hand to grab an ankle, and groped for his short sword again. The struggling guard began to yell. Nils partly heaved the corpse from his back, clinging to the kicking ankle with an iron grip, hamstrung the man, pulled his falling body in close, and began to chop at his back. The guard screamed twice before the blade split his rib cage.

Nils found a key and unlocked his manacles, listening intently both with ears and psi sense. The only pickup was a frozen intentness from farther down in the dungeon, where he had sensed other prisoners earlier. If the yells had penetrated the door above, anyone who heard them must have interpreted them as normal dungeon sounds.

Nils moved quietly down the stairs, carrying the dropped torch, with two harnesses and swords over one shoulder and one at his waist. The first prisoner he found stared at him through hard eyes. The man had the build of a fighter, a knight, and looked as if he had been there only a few days.

"Do you want one of these?" Nils asked, touching a scabbard.

The man's mind flashed understanding of his Anglic. "Let me have it," he answered grimly, and Nils freed him.

The next prisoner was gaunt and haggard. The first spoke with him in Magyar and turned to Nils for the key. "His leg is in bad shape, where the iron has rubbed a sore on the ankle bone, but he can walk."

Farther down they found a third man, who only sat and stared, slack mouthed, when spoken to. His bony chained arm was rotten to the elbow, and he picked at it with filthy fingers. Nils looked into his mind for a moment, then put his sword to the man's chest, and thrust.

At the bottom of the staircase they found a chamber with a rack and other instruments, and a stained block, but no door or corridor leaving the place. In one wall was what looked like a large fireplace, but with no sign that it had been used as such. The first knight went to it.

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"A shaft," he said, "for removing bodies secretly. You look able to climb it, and there should be a windlass at the top."

Nils ducked into it and stood. Looking up he could see nothing but blackness. He pressed his back against the front of it and muscled his way up like an alpinist in a chimney, moving as rapidly as possible. It was a long climb—as high as the stair. When he reached the top he found the darkness barely alleviated by light diffused from somewhere down a corridor. As the knight had predicted, there was a windlass, and Nils lowered the sling. When the rope slackened he waited, until he felt a tug, then began to crank.

It was the injured man he raised. He had begun to lower the sling once more when suddenly there was a shout from far below. "Hurry! They're coming!" He jerked rope from the windlass then, sending the crank spinning, and stepped astride the narrow dimension of the shaft. There was faint shouting and a cry of "Pull!" Hand over hand he drew on the rope with long strokes, disdaining the slow windlass, and in a few moments the knight grasped the edge of the shaft. Together they hauled him out onto the floor, Nils's breath great heaving gasps from the violence of his exertions, and for a moment he failed to read the mixture of pain and rage in the man's mind. One foot and calf had been sliced by a sword, thrust after him as he started up.

"Where are we, do you know?" Nils asked when he was able.

"I think so. But we can't get away because they know where we are. Even now there must be men hurrying to cut us off. But this time they'll have to kill me. I don't intend to end up like that one down there."

"I'm going back down, then," said Nils. "I may have a better chance where they don't expect me."

The two Magyars exchanged brief words. "Good luck then," said the one who spoke Anglic. "And I hope you kill many." They shook hands with Nils and limped away down the dark corridor.

Nils slid down the rope into the torture chamber and moved quickly up the stairs, past the bodies of the dead prisoner and the three guards. The door at the top was not locked, and he peered out cautiously into the corridor. There was no one in sight. He opened the door no more than necessary, avoiding the abominable screech of hinges, slipped through, and took the direction away from the guard room.

Within a few strides he heard booted feet behind him, not yet in sight, but he did not hurry, depending on the poor disguise of his blood-spattered guard cloak and cap for protection if seen. Within a

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few meters a curtain hung to the floor on his left and he pushed through it, finding a flight of stairs. He bounded silently up, then stopped at the uncurtained opening at the top. Slippered feet scuffed the corridor before him, and a female mind mumbled to itself in Magyar. The feet would either pass by the stairs or turn down them. At the same time he heard the voices of men below, stopped just outside the curtain. Nils realized he was holding his breath. A middle-aged woman passed the stairwell entrance without looking in. Waiting a moment to avoid startling her he stepped into the corridor behind her and moved in the opposite direction. A door opened and closed, and he sensed the dimming of psi pickup.

The voices from below were louder now, as if someone was holding the curtain open, and he hurried. This corridor ended at a window, through which he could see the frozen courtyard a dozen meters below. Without hesitation he turned, opened the door to the nearest chamber, and walked in.

A tall bald man, wide-shouldered and wearing a long robe, sat before a fire. He turned his weathered hawklike face to Nils and rose, speaking coldly in Magyar. Nils responded quietly in Anglic.

"I am a foreigner and do not understand Magyar. I had planned to seek service with King Janos, but was imprisoned here because this lord has no love for his king. But I killed three guards and escaped, and now they are hunting for me. Call out and you're a dead man."

Nils, his hair cut and wearing the livery of Lord Miklos, sat a horse among Lord Miklos's guard troop. Miklos's voice spoke clearly in the frosty morning air.

"I will repeat the warning, Lajos," he said in Magyar. "You owe your fief to the crown, and homage, and the taxes and services prescribed by law. Twice you've failed those taxes, and the respect that should accompany them. The next time Janos will send an army instead of an ambassador. Those were his words. Think about them. And if duty means little to you, consider how precious you hold your life."

With that he turned his horse, and followed by his guard troop rode stiff-backed across the iron-frozen courtyard and over the drawbridge.

XI

Lord Miklos looked tired and grim when Nils was ushered into his chamber. The young barbarian didn't need psi to know that the reason was the unexpected death of Janos II during Miklos's absence, and the ascension of Janos III to the throne.

"You traveled far to serve King Janos," Miklos said, "and now he is

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dead. And while I know little about you, what I know, I like. I will be happy to have you serve me, if you wish to."

"Thank you my lord," Nils answered. "But nonetheless, I came to serve King Janos, and a Janos sits on the throne. Therefore I must ask to serve him. If he refuses, and if you still want me, I will be proud to serve you."

Miklos walked to the window and stared out, then turned and spoke carefully in explanation. "Janos III is not the man you sought to serve, nor the same sort of man. If it wasn't for the family resemblance and the nobility of his mother, I could hardly credit the elder with the fathership. Janos II was a noble man, fair, firm, and honorable, and a man well fitted to rule. The son, on the other hand, is at best shallow and petty, and it will seldom occur to him that there are considerations beyond his pleasure. He is devious without the compensation of cleverness, and shrewd men, if they flatter him, can lead him. And the men who have his confidence are secretive, and what is known about them is not good.

"But the worse that is said of him is only rumor—that he will sanction, if not actually support, the vile cult of Baalzebub. Perhaps I shouldn't have told you that, for I've seen nothing that can stand as proof. But there is evidence, serious if indirect."

"Nonetheless," Nils replied, "I must seek service with King Janos, for I was told that I would by a seeress whose worth I value highly."

"You believe in seers? I wouldn't have thought it."

"I believe in this seeress, for I know her powers. They saved my life once."

"I see. Well, if that's what you want. I would recommend you to the new king, but he'd take any recommendation from me as a cause for distrust." Miklos looked long and perplexedly at Nils, then rose and held out his hand. "If he refuses you, or if you enter his service and wish to withdraw, let me know."

The sergeant was explaining to the guard master. "He said he had come several hundred kilometers to seek service with King Janos. He doesn't even speak Magyar, and I had to use Anglic with him. But he is a giant"—the sergeant motioned with his hand somewhat above the height of his own helmet—"and something about him gives me the feeling that he's a real fighter and not just a big oaf. In appearance alone he would please his majesty."

"All right, Bela, I'll look at him. His Highness is tolerant of foreigners. But he'll have to look mighty good before I'll ask the men to put up with someone who speaks no Magyar."

The big iron stove was hot and Nils, after the manner of the neovikings, had hung both jacket and shirt on a peg. Disdaining a bench,

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he squatted with his back to the wall, paring his nails with a large belt knife. When the two knights entered the guard room he arose, calmly and with a fluidity of movement that made the guard master suspect he might do at that. After a few questions he sent a guardsman to Janos, asking for an audience. Shrewdly he had Nils leave his jacket and shirt on the peg where they hung, and took him to Janos with his torso bare except for harness.

Janos was a man of ordinary size, his face dominated by the pointed nose and red moustache of his father's line. Nils sensed no evil in him, nor anything else remarkable, only a mediocrity of energy and smallness of vision. At the king's command Nils rose from his knees. Janos's blue eyes examined him minutely, without his face betraying his judgment, but Nils sensed that this was a man who was readily impressed by physical strength.

"Where are you from?" the king asked at length.

"From Svea, Your Majesty."

"Svea? And where might that be?"

"Far to the north, Your Majesty. Beyond the lands of the Germans lies the northern sea. Across that sea the Götar dwell, and the Svea live north of them. Beyond the Svear no one lives."

"Ah. And is it true that in the north, so far from the sun, the lands are colder and snowier?"

"Yes, Your Majesty."

"Then Svea must be a terrible land. I don't blame you for leaving it. But why did you come all this way, to seek service with the king of the Magyars, when there are so many kings and realms?"

"A seeress told me that I would, Your Majesty, and so I did."

"A seeress!" Nils sensed that this impressed the king strongly. "And what seeress was that?"

"A woman who lives in the forest, Your Majesty, and talks to the wolves. Her name is Ilse."

Janos examined this indigestible bit, and dropped it. "And do you fight well?"

"I've been told that I fight very well, Your Majesty."

Janos turned to the guard master, "Ferenc, let me see him tested."

For an instant the guard master was dismayed. He'd neglected to test the man! Supposing he was an oaf after all? "I will test him myself, if that will be all right, Your Highness."

"Fine. That will be abundantly demanding."

The guard master spoke to one of the throne guards, who went to Nils and handed him a sword and shield. Nils handled the sword lightly, its weight and balance registering on his neuromuscular system. Then they faced each other with swords at the ready. The guard master began the sword play

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slowly, examining Nils's moves. Nils was content to parry and counter. The guard master's speed increased, and Nils sensed his growing approval. A sudden vigorous and sustained attack failed to make an opening, and the guard master stepped back sweating in the heated throne room.

"He is very good, Your Highness," he said, turning to the king. "He's surprisingly quick and knows all the moves. His teacher must know his business. If we'd been fighting instead of sparring I would have been hard pressed, for then his great strength would have begun to count."

Later, in his chamber, the king rang for his privy counselor, a man of whose very existence few in the palace knew, and those who did kept a fearful silence. He came at the king's call.

"Did you read the man that Ferenc brought to me for the guard?" Janos asked.

"Yes."

"What did you see in him? Was he telling the truth about a seeress?"

"He was truthful at all times. I am limited in reading him because his native tongue is unfamiliar to me, but I assure you he was truthful. I believe he is unable to lie."

"You're joking!"

The counselor bowed slightly. "I never joke, Your Highness. There is something about him that makes me believe he is unable to lie."

"Amazing. What a terrible handicap."

Sometimes you are almost discerning, the counselor thought to himself. And ordinarily I would agree with that reaction. I wish the swine held discourse with himself. I've never known anyone before who could stand fully conscious for several minutes and not talk to himself within his mind. And it isn't a screen as with the Master. I will watch him carefully.

The guard soon accepted Nils as one of them, despite their normal animosity toward foreigners. In sparring he was never bested, but even so the men sensed that he held himself in, and they interpreted this as a desire to avoid making anyone look bad. His disposition was mild and harmonious. And he learned quickly, so that within a few weeks he could converse carefully on a fair assortment of subjects.

One day of his first week Nils was being instructed in Magyar by Sergeant Bela when a boy in his early teens entered the guard room, dressed as a squire, and spoke to the sergeant. Bela turned back to Nils.

"This is Imre Rakosi, Nils, a squire to the king. He wants to talk to you through me, as he doesn't have much confidence in the little Anglic he speaks. First,

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he wants to know if it's true that you are a great swordsman."

"I seem to be," Nils said. He sensed an openness and honesty in the boy.

"And is it true that you come from a barbaric land far from the sun, and have traveled in many lands?"

"That's true, too," Nils admitted, "except that I have traveled only in several lands."

Bela turned and recounted all this in Magyar. Then he turned back to Nils. "Imre would like to learn Anglic. And he believes it would be more interesting to learn it from you than from some other tutor, for in the learning he hopes to hear about lands and customs that we know little of in our land. Will you teach him?"

"I'll be glad to."

The boy addressed Nils directly now, in Anglic. "Thank you," he said carefully, holding out his hand. Nils shook it.

"He would like to begin after supper this evening," Bela said, "in the outer hall, for it's always open and the benches there are comfortable. If he can't be there, he'll send you word. Is that all right?"

"Certainly," said Nils, and Imre Rakosi left.

"Are squires here the sons of nobles, or other knights?" Nils asked.

"Usually. This one is the son of Lord Istvan Rakosi of the eastern marches."

"And was he sponsored earlier by the older king, Janos II?"

"No, he's been with Janos III for almost eight years, since the boy was seven and old enough to serve as a page. The king is a widower, and childless," the sergeant explained, "and this boy is like a son to him. And he's a good lad, as Janos is a good master."

Nils had the third and fourth watches—from 0800 to 1600—and his duties were primarily two. When Janos held court, Nils was one of his personal guards, standing behind the throne and to its right. At other hours when Janos was in the throne room, Nils's post was outside the thick door.

And in a chamber behind the throne room a lean, dark brown man sat in a black robe reading the minds of the king's visitors. But always, whether Nils stood by the throne, or even outside the heavy door, the secret counselor monitored the big warrior's mind with one small part of his superbly sensitive psychic awareness. He received almost nothing in the way of either thoughts or emotions, for mostly Nils simply received, sorting and filing data of almost every kind without discussing it with himself.

But the evidence was there, increasingly unmistakable.

One winter evening the counselor took from a small chest a gray plastic box, closed a switch,

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and patiently waited. He didn't wait long. As a needle oscillated abruptly across a dial, a voice in his mind commanded him.

His mind reviewed the event of Nils's arrival, and what he had observed, the little he had been able to learn from Nils's mind, and what he had learned from the minds of others when they had thought about Nils. "And there is no question," he thought, "the barbarian is a psi, and I feel he is not here accidentally. I don't know any details, for I can read nothing specific myself. But you could force him, Master."

His thoughts paused, as if hesitating, and there was a sharp painful tug at the counselor's mind that made him wince and continue.

"And today, as I watched, I became aware that he knows I am here, and that he let me know purposely, realizing that I would know it was purposely. Of course he could easily know of me from the king's mind. But he knows more about me than the king does, and he knows all that I am.

"And he is as undisturbed as a stone."

That winter at Pest was the coldest of memory, Nils was told. Old people, and even the middle-aged, complained that winters were longer and colder than when they were young. But even recent winters had had frequent days when temperatures rose above freezing; weather when the surface of the ground thawed to mud. This winter it remained like stone. The snow from the great October storm had never been much deeper than a man's knees at Pest, and little new snow had been added. Yet until late March the ground remained covered except on south slopes and near the south sides of buildings.

The River Danube, which the Magyars called Duna, froze deeply, and boys and youths fastened skates to their feet for sport, while people of every age cut holes through the ice and fished for pike and sturgeon. Not until April did the ice rot sufficiently that several fishermen fell through to be carried away beneath it by the current.

By that time Nils had taken opportunities to examine maps, but made no plans. When the time came he would have a plan. Meanwhile he worked, ate, slept, and learned, and found life quite agreeable. Imre Rakosi had learned to speak the simple Anglic tongue quite creditably, while Nils, living with the Magyar tongue, had substantially mastered its agglutinative complexities. The two youths had become close friends.

At the beginning of April they had the first days of true spring that promise summer. On one such day both were free of duty, and they rode together along a muddy rutted road above the Duna, watching the fishermen standing in

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the shallow water that flowed across the gray and spongy ice. But on a shirt-sleeve day in April they found little inspiration in the sight of an ice-bound river; therefore they left the bank and turned their horses up the rubble-paved road to Old Pest.

Old Pest had been immensely larger than the present town. Around Old Pest lay the open plain, grazed in summer or planted with wheat. But Old Pest itself was a large forest, mainly of oak but with other broad-leaved trees, its openings overgrown with hazel brush. The rubble and broken pavement prevented cultivation, at the same time concentrating rainwater in the breaks so that trees could sprout and grow. Here and there parts of a building still stood above the trees. The rest had fallen to fires, floods, or storms, or simply to the ravages of time and weather on cement and mortar. Over the centuries many building stones had been hauled away to be used in the growth of New Pest, and concrete had been crushed for remanufacturing. Even steel construction rods had been broken and hauled away, to be stacked in smithies for cleaning and reuse. And the paving stones of Pest came from the rubble of Old Pest.

The present town had grown up several kilometers from the edge of the old city. Neither merchants, nobles, nor commoners cared to house near the cover it provided to bandits and other predators.

Imre had never been in Old Pest before. Bears, wolves, and wild dogs actually were few there in these times, for herdsmen organized hunts, with hounds and scores of armed and mounted men, to hold down depredations. And bandits usually were only transient there, for soldiers of the king hunted them. But explorers occasionally disappeared and were not seen again, or were found dead and sometimes mutilated.

Imre and Nils poked cautiously about in one building whose lower levels still stood, and wondered whether it could ever have housed men. There were no stoves or fireplaces, or anything to take away smoke, or anything to see except debris. "It's more pleasant outside than in here," Nils commented.

"You're right. Let's go back out. Anyway there's only one building I really want to see. I've looked at it from a distance through the palace windows, and the whole immense thing still seems to be standing. It may be farther than we have time to go through, and maybe we wouldn't be able to find it in this wilderness anyway."

They mounted and rode farther on among the trees. "Do you mean the building with the huge dome?" Nils asked.

"That's the one. It is said to be a church."

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"And what is, or was, a church?" Nils wanted to know.

"Well," explained Imre, "in the olden times men believed in imaginary beings, who were thought to be very powerful and therefore had to be given gifts and sung to, and in general the people had to debase themselves before them. Even the nobility; even the kings. And great palaces, called churches, were built and dedicated to the chief of those beings, who was called Christianity."

"I'm surprised I never heard of that before," Nils said, as his horse stepped over a fallen tree.

"It is said that those beliefs died out before the Great Death. Perhaps in your land even the memory was lost, or perhaps the superstition never existed there."

They were passing the base of a great hill of rubble upon which only scattered shrubs and scrubby trees stood, but numerous stalks of forbs lay broken, suggesting that in season it would be alive with wild flowers. Turning their horses they rode toward its top, hoping to get a better directional fix from its elevation.

"I've heard," Nils remarked, "that some Magyars now believe in a supernatural being called Baalzebub. Have any churches been built to him?"

"There can't be churches to Baalzebub. It's against the law to follow him."

"But wasn't it the elder king who made that law? There are those who whisper that Janos III permits him to be worshiped."

"Then they lie," Imre said decisely, "for my lord has told me that the cult of Baalzebub is vile, and that if I ever have anything to do with it he will throw me out." He paused and looked upward. "I guess our sunshine is gone, and this rising wind is cold. Do you want to go on or shall we go back to Pest?"

"Let's go back," Nils answered, and they rode briskly down the slope into the trees.

"Nils, why did you ask about Baalzebub?"

"Not through any wish to offend you, I promise you that."

"I believe you," Imre said. "But let me explain something to you, that may make a lot of things clear. There are those who dislike our lord because he is not the strong and open man his father was, and they pass evil rumors about him. But I've known him since I was a little boy, almost as long as I can remember, and he has been a second father to me. And I know his faults, but I also know he is a good man."

"Did he take you with him on his trip to the lower Duna?"

"No. He took none of his household except part of his guard troop and a valet. I was only ten when he went."

"Was it from there he brought his brown-skinned counselor?"

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"What brown-skinned counselor?" Imre asked in puzzlement. "You mean Lord Kodaly?"

"No, much darker than Lord Kodaly. A secret counselor named Ahmed who sits in a chamber behind the throne."

Imre looked strangely at Nils. "How could the king have a counselor in the palace, and one with a dark brown skin at that, without my having seen or heard of him until now?"

"There is one, nonetheless. He came here from a city on the lower Duna, near where it flows into the sea, but I believe that before that he came from even farther away."

A strong gust of wind rattled the bare branches above them. "Look, snowflakes!" Nils said. In a few moments the air was swirling with them, and Nils and Imre spurred their horses to a trot where trails permitted until they came out of the forest. Then, faces glowing from exhilaration and wet snow, they galloped down the road to Pest.

And from that time Nils was prepared for a trip down the Duna, possibly in chains, unless, of course, he was killed instead. For Ahmed would certainly read Imre, and Kazi would either want to examine this barbarian psi himself or have him disposed of.

Within weeks the message came to Janos, by a courier in livery richer than the people of Pest had ever seen, with a troop of tall swarthy horsemen on animals that awed even the great Magyar horse breeders. Kazi sent it this way instead of through Ahmed in order to keep the psi tuner secret from Janos.

"Ahmed," Janos said, "I won't stand for it. Why does he want me to send the boy to him?"

Ahmed looked thoughtfully at the soft bleached parchment, as if he hadn't known before what would be written there, or why. "Perhaps he doesn't trust you."

"But that's nonsense. Why should he distrust me? I've done nothing to earn his distrust."

"I don't *know* that he distrusts you, but that would explain his request. Remember, you are hundreds of kilometers away from him, and he has no way of looking into your mind. He is used to knowing the minds of everyone around him, and is impatient when he can't."

"So he wants the boy as a hostage then," Janos snapped. "He can't have him."

"Why not?" Ahmed asked. "You know he'll treat him like a prince, for he depends on you, and youth enjoys the adventure of strange lands. Send the giant barbarian with him as bodyguard and companion, for they are close friends."

Janos sat quietly for a few moments, his face at first still angry, then gradually grim, and finally

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thoughtful. "All right," he said at last, "I'll do it. Imre and the barbarian, too, on my royal barge. They can have the courier and his troop for an escort, and a detail from my guard. I will also provide a barge for the courier troop, and they can leave their horses with me as a gift." He looked at Ahmed, thin-lipped. "But I don't like this hostage business, for I gave him my word, and I'm not used to being treated like this."

XII

While a man was chief of the Svear, his home village would be known as Hövdingeby, the Chief's Village. During the chieftainship of Axel Stornäve, Hövdingeby was in the greatest farm clearing in Svea, called Kornmark for the barley that once was grown there. Now barley could not be relied on, and the grain that filled the bins after harvest was mostly rye.

Kornmark covered a somewhat irregular area of about two by five kilometers, broken here and there by birch groves, swales, and heaps of stones that had been picked from the fields. There were three villages in Kornmark, one near each end and one near the center, each covering a few hectares. Each was a rough broken circle of log buildings—the homes, barns, and outbuildings of the farmers—surrounding a common ground. In the middle of the common was the long house, containing a meeting hall, guest lodgings, and the communal steam bath.

It was late May, when the daylight lasts for more than eighteen hours. Normally in that season cattle would have been in the fields, fattening on new grass, and the air would have been pungent with smoke as the boys and women burned off last year's dead grass in the surrounding pasture woods. But this year the fields were still soft brown mud, while along the leeward sides of the stone fences there still lay broad low drifts of granular snow.

A thin cold rain drove out of the west against the backs of two warriors who were walking across the clearing on a cart road. Their leather breeches were dark with the rain, and the fur of their jackets was wet and draggled. In the forest, where spruces and pines shaded the trails, they had run on skis. Now each carried his skis on one wide shoulder, with his boots slung over the other, and the deep tracks of their tough bare feet filled at once with water.

Big flakes of snow began to come with the rain.

Near the east end of the clearing, above the high bank of a river, was Hövdingeby, which also was called Vargby because it was the original home of the Wolf Clan and its major village. The longhouse there measured thirty meters, and many men could sleep in its steep-

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roofed loft. Its logs had been squared with broad ax and adze, so that they fitted almost perfectly, and even the stones of its smoking chimneys had been squared. At each end the ridge pole thrust out three meters beyond the overhanging roof, curving upward, scrolled and bearing the carven likeness of a wolf. Hides covered its windows, scraped thin to pass more light, but on the westward side the shutters were closed against the rain.

The two warriors walked up its split-log steps and scraped their muddy feet on the stoop. One rapped sharply on the plank door with the hilt of his knife, and a stout thrall woman let them in. It was cold and gloomy in the entry room. Though Svear, the two warriors were not of the Wolf Clan, so they waited there, with the silence of men who had nothing new to say to each other and were disinclined to talk for the sake of breaking silence. Shortly a tall old man, Axel Stornäve himself, came out to them wearing a loose cloak of hare skins. "You are the last to arrive," he said. "I'm sorry my messenger took so long to find you." The hands that gripped could have crushed necks.

"We are often gone from our homes," one answered. "Reindeer are not cattle and the herds must range far for forage."

The old man ushered them into the hall. "We have dry clothes for you," he said. "I'll have food warmed and the stones heated in the bathhouse. When you have eaten and bathed I suggest you rest. We will all meet together at the evening meal, and it may be late before the talking ends."

The men at the evening meal were the chiefs of the three tribes, with their counselors, and the clan chieftains of the Svear, each with his lieutenant. They ate roast pig, that most savory of flesh, smoked salmon, and blood pudding thickened with barley and sweetened with honey that had found its way there from southern Götaland. And there was fermented milk, and ale, but no whiskey, for these men were sometimes enemies who had put aside their feuds to meet together, and Axel Stornäve did not want the blood to run too warm in their veins.

When the platters were taken away, Stornäve rose, the oldest man of them, and they all listened, for warriors did not live as long as he had without skill, cunning, and luck.

"Some in my clan," he said, "and in all the clans of the Svear, have talked in recent years of leaving our land. They have heard of lands where the summers are longer and warmer. And I have heard it is the same among the Götar and Norskar." He turned toward the bull-like form of Tjur Blodyxa, chief of the Götar. "I have heard that in Götaland the

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Sea Eagle Clan began last summer to build large boats, ships, in which to send strong war parties to find a better land. It was also told at the last ting of the Svear"—here he turned grimly to Järvklo of the Gluttons—"that our own northern clans whisper of breaking the bans and trying to take away land from the clans to the south unless we willingly make room for them.

"And now we have had this winter unlike any before, and our people wonder if we can make a crop. We have had to kill many of our cattle, poor in flesh, because the hay barns were becoming empty and it's better to kill some than lose all. But we have butchered the seed, so that calves will be few. And we cannot live on wild flesh, for there are too many of us." He paused and looked around at the faces turned toward him. "So I believe the Sea Eagles have the right idea," he went on. "The time has come to leave.

"But the lands to the south are peopled already. We have all heard wanderers who have been to some of them. A wanderer of your Otter Clan"—he turned again to Tjur Blodyxa—"has told us stories in this very longhouse of the Daneland, where he had lived, where the clearings are greater than the forests, and where the warriors have high stone walls to protect them. And when I questioned him he said that in the Daneland, too, people complained that the winters were growing longer and harder.

"And from your Seal Clan"—he turned to Isbjørn Hjeltesen, chief of the Norskar—"a wanderer told us of the Frisian land, south across the sea, where the people speak a tongue we cannot understand, and whose pastures and haylands a man can't see across. There they complain that each year they must build their haystacks bigger, and haul more wood from the distant forests.

"Is the whole world freezing? Or are there really lands where the summers are long and warm? We all have heard rumors of them. But how does one come to such lands? There is a man of the Wolf Clan who may be the greatest traveler of all. Last fall he returned from four years of absence, telling tales of the lands he had visited. He is Sten Långresare; you can talk to him later and ask him questions. He brought with him what you see on this wall." The old chief turned and pulled a bearskin from the pegs on which it had hung, exposing a map of Europe. "This is a map, the craft of whose makers far exceeds ours. It is said to be a copy of a map of the ancients and is made on a stuff called linen. North is at the top, as on the maps we make ourselves. Here," his big finger circled, "are the lands of the tribes. The blue is the sea."

Axel Stornäve looked around the table. All eyes were on the marvel before them, so he con-

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tinued talking and pointing. "Sten journeyed across several lands and finally came to this southern sea. And he found that what we had believed actually is true: that as you continue south toward the sun the climate gets warmer. The lands around that sea are never cold, except high in the mountains, and even in the heart of winter the snows lie on the ground for only a few days at a time, or a few weeks at worst.

"That is a land where the clans could be happy.

"There are two ways to reach that land. One is by sea." He traced a route from Oslo Fjord across the North Sea, southward along the Atlantic coast and through Gibraltar. Grim eyes watched. "Although perhaps we would not have to go that far. This might serve as well." He pointed to the coast along the Bay of Biscay. "But, if every fishing boat left filled with warriors, they still would be too few. By the time the boats could make a second trip, those few would be dead at the hands of the tribes who live there now.

"The second way is across the land, after boats have made the short trip here." He ran his finger along the shores south of the Baltic. "The tribes of each land we entered would fight, of course, and their people are very numerous, so that there are many of them for each one of us. In some of those lands the chiefs hire foreigners in their armies, so that Sten never went hungry for food or for fight, and their warriors, which they call knights, are much less skilled with weapons than we are. Also, their warriors do not care to go on foot. If they must go into battle on foot, they prefer to wait and avoid the fight. He even found some he believed would hardly be able to fight after a day's march. Do not be mistaken. They have fierce men, and men not afraid to die"—here the old chief paused for effect, then spoke slowly and clearly—"but never did he find any warrior who was a match for one of ours.

"But still, if the Sea Eagle Clan landed here"—and he pointed to northern Poland—"at the nearest place to their homeland, and started south, the knights of that district would attack them and kill many. And the chief of that land would gather a strong army, many hundreds, and attack until no men of the Sea Eagles were left alive, they would be so outnumbered. And what then of their women and children?

"But here is a place with low sand hills along the coast, covered with forest, and only a few fishermen live there." He pointed to a stretch of Polish coast. "And behind the sand hills are marshes, where knights cannot cross on their horses. If the Sea Eagles landed there, it is likely that they would not be strongly attacked so long as they stayed there.

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"And what if the Otter Clan followed, and the Bears, and then others? This district behind the coast," he continued, his big finger touching the map, "also has large forests. If enough warriors landed on the coast, they could march in strength and defend and hold some of the forest while still more of the people landed—freeholders, women, children, and thralls. If *all* the clans landed there, I believe they could then cross the lands to the south, regardless of the armies raised against them, and take and hold a land near the southern sea."

The old chief looked around the split log table then for a moment without speaking, and a small smile began to play at the corners of his wide mouth. "I see that Järvklo of the Gluttons wants me to sit down so that he may speak. He wants to ask me how I propose to move the tribes across the sea in a few score fishing boats that cannot take more than a dozen men each, besides the oarsmen.

"I led the Wolf Clan before I was chosen chief of the Svear, and I have talked about this to the warrior who now is chieftain of the Wolves, Ulf Vargson. He in turn held council with his warriors and freeholders in this very hall. And it is agreed. The Wolf Clan will send out a dozen fishing boats of warriors with Sten Långresare to guide them. They will find this place I spoke of," he pointed, "land the warriors, and come back for more.

"But on the second trip all our boats will go, and most of them will go here"—he pointed to a harbor on the Polish coast—"where there are ships large enough to carry a hundred men besides the oarsmen. And they will seize such of those ships as they can, returning here with them."

Strong yellow teeth began to show in the torchlight around the table, and there were grunts of pleasure.

"The Wolf Clan would go alone if they had to, but I know they won't have to. I know the other clans too well, from many raids and battles. And the Sea Eagles had already decided to go before we did. If all the clans unite, our combined strength can bring us to the southern sea.

"Look!" Axel Stornäve knelt for a moment, and picked up a bundle of pine branches that had lain on the floor behind his seat. He held one branch up and snapped it in his hands. "Alone it has little strength," he said, "but now"—he took as many together as he could wrap his huge hands around, with a great effort strove to break them, and then held them overhead unbroken.

"Which of you will go back to your people and join them with us?"

Every man around the table stood, shouting approval. Axel

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still stood, with one hand in the air, and in a few moments the others settled to the benches again, aware that he was not done.

"I knew it," he said. "And when you take this matter to your people they will agree to it, for this winter has caused every man to think. But we can't delay. If we can make no crop this summer except of hay, and if next winter is like this one has been, we will be weak and hungry in another year. We must all be gone before winter comes again. Nor can we winter across the sea except in force, for we must be able to take what we need by force from the people in those lands.

"Our harbor is free of ice now, at last. Our people already have been killing the rest of our cattle and drying the meat over fires. We will send the first boats on the day after tomorrow, the weather willing. After our first war parties have landed, two boats will go here." He pointed to the island of Bornholm, between the Swedish and Polish coasts. "One will wait to guide the first boats of the Götar to the landing place." He looked down the table at one old enemy, Tjur Blodyxa, and then in the other direction toward another, Isbjørn Hjeltesen. "The other will guide the first boats of the Norskar." The old man grinned. "Maybe you can get the Danes to 'contribute' some ships."

A scowl had begun to grow on Tjur Blodyxa's surly face, and he stood without leave. "And who will lead this expedition?" he asked.

Axel Stornäve said nothing for a moment, savoring the surprise he had for the Göta chief. "Not me," he said. "I'm too old. That leadership is what we must decide next."

It was past midnight. They had agreed that the tribes would act independently in moving their own people, except that the Wolf Clan of the Svear would pick the place. But the war leader of those who had landed would also be of the Svear. Then the clan chieftains of the Svear elected Björn Ärrbuk as war leader. He was the tribe's most famous fighter, and its most famous living raid leader. Afterward they questioned Sten Långresare about the place where they would land, and the country where they hoped to go.

Now the warriors were going to bed. Axel Stornäve stepped out the door to look at the night and found new snow ankle-deep on the ground.

To be concluded

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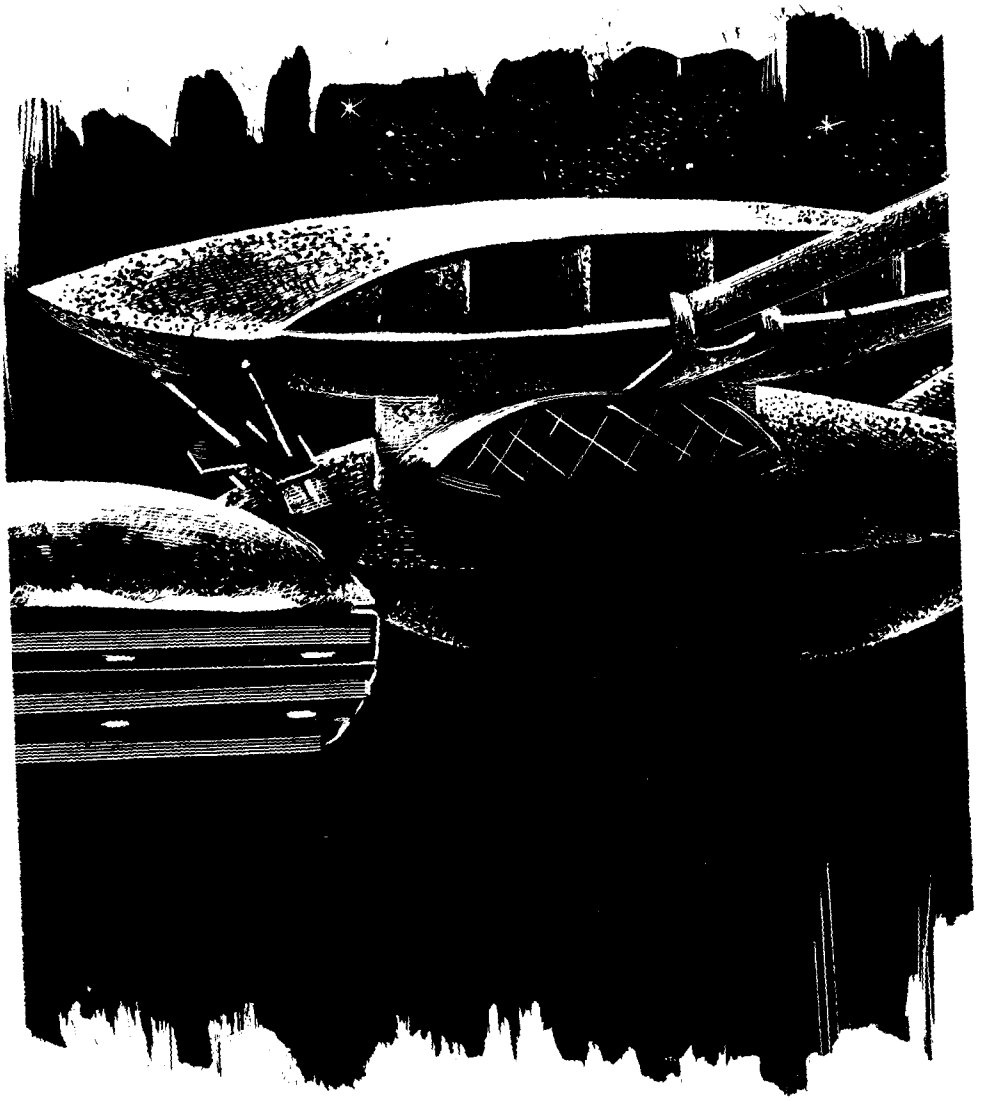

a relic of war

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There will be, surely, a type of soldier
of whom it can truly be said "Old soldiers never die . . ."

KEITH LAUMER
Illustrated by Vincent diFate

The old war machine sat in the village square, its impotent guns pointing aimlessly along the dusty street. Shoulder-high weeds grew rankly about it, poking up through the gaps in the two-yard-wide treads; vines crawled over the high, rust-and guano-streaked flanks. A row of tarnished enameled battle honors gleamed dully across the prow, reflecting the late sun.

A group of men lounged near the machine; they were dressed in heavy work clothes and boots; their hands were large and calloused, their faces weather-burned. They passed a jug from hand to hand, drinking deep. It was the end of a long workday and they were relaxed, good-humored.

"Hey, we're forgetting old Bobby," one said. He strolled over and sloshed a little of the raw whiskey over the soot-blackened muzzle of the blast cannon slanting sharply down from the forward turret. The other men laughed.

"How's it going, Bobby?" the man called.

Deep inside the machine there was a soft chirring sound.

"*Very well, thank you*," a faint, whispery voice scraped from a grill below the turret.

"You keeping an eye on things, Bobby?" another man called.

"*All clear*," the answer came: a bird-chirp from a dinosaur.

"Bobby, you ever get tired just setting here?"

"Hell, Bobby don't get tired," the man with the jug said. "He's got a job to do, old Bobby has."

"Hey, Bobby, what kind o' boy are you?" a plump, lazy-eyed man called.

"*I am a good boy*," Bobby replied obediently.

"Sure Bobby's a good boy." The man with the jug reached up to pat the age-darkened curve of chromalloy above him. "Bobby's looking out for us."

Heads turned at a sound from across the square: the distant whine of a turbocar, approaching along the forest road.

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"Huh! Ain't the day for the mail," a man said. They stood in silence, watching as a small, dusty cushion-car emerged from deep shadow into the yellow light of the street. It came slowly along to the plaza, swung left, pulled to a stop beside the boardwalk before a corrugated metal store front lettered BLAUVELT PROVISION COMPANY. The canopy popped open and a man stepped down. He was of medium height, dressed in a plain city-type black coverall. He studied the store front, the street, then turned to look across at the men. He came across toward them.

"Which of you men is Blauvelt?" he asked as he came up. His voice was unhurried, cool. His eyes flicked over the men.

A big, youngish man with a square face and sun-bleached hair lifted his chin.

"Right here," he said. "Who're you?"

"Crewe is the name. Disposal Officer, War Materiel Commission." The newcomer looked up at the great machine looming over them. "Bolo *Stupendous*, Mark XXV," he said. He glanced at the men's faces, fixed on Blauvelt. "We had a report that there was a live Bolo out here. I wonder if you realize what you're playing with?"

"Hell, that's just Bobby," a man said.

"He's town mascot," someone else said.

"This machine could blow your town off the map," Crewe said. "And a good-sized piece of jungle along with it."

Blauvelt grinned; the squint lines around his eyes gave him a quizzical look.

"Don't go getting upset, Mr. Crewe," he said. "Bobby's harmless—"

"A Bolo's never harmless, Mr. Blauvelt. They're fighting machines, nothing else."

Blauvelt sauntered over and kicked at a corroded tread-plate. "Eighty-five years out in this jungle is kind of tough on machinery,

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Crewe. The sap and stuff from the trees eats chromalloy like it was sugar candy. The rains are acid, eat up equipment damn near as fast as we can ship it in here. Bobby can still talk a little, but that's about all."

"Certainly it's deteriorated; that's what makes it dangerous. Anything could trigger its battle reflex circuitry. Now, if you'll clear everyone out of the area, I'll take care of it."

"You move kind of fast for a man that just hit town," Blauvelt said, frowning. "Just what you got in mind doing?"

"I'm going to fire a pulse at it that will neutralize what's left of its computing center. Don't worry; there's no danger—"

"Hey," a man in the rear rank blurted. "That mean he can't talk any more?"

"That's right," Crewe said. "Also, he can't open fire on you."

"Not so fast, Crewe," Blauvelt said. "You're not messing with Bobby. We like him like he is." The other men were moving forward, forming up in a threatening circle around Crewe.

"Don't talk like a fool," Crewe said. "What do you think a salvo from a Continental Siege Unit would do to your town?"

Blauvelt chuckled and took a long cigar from his vest pocket. He sniffed it, called out: "All right, Bobby—fire one!"

There was a muted clatter, a sharp *click*! from deep inside the vast bulk of the machine. A tongue of plae flame licked from the cannon's soot-rimmed bore. The big man leaned quickly forward, puffed the cigar alight. The audience whooped with laughter.

"Bobby does what he's told, that's all," Blauvelt said. "And not much of that." He showed white teeth in a humorless smile.

Crewe flipped over the lapel of his jacket; a small, highly polished badge glinted there. "You know better than to interfere with a Concordiat officer," he said.

"Not so fast, Crewe," a dark-haired, narrow-faced fellow spoke up. "You're out of line. I heard about you Disposal men. Your job is locating old ammo dumps, abandoned equipment, stuff like that. Bobby's not abandoned. He's town property. Has been for near thirty years."

"Nonsense. This is battle equipment, the property of the Space Arm—"

Blauvelt was smiling lopsidedly. "Uh-uh. We've got salvage rights. No title, but we can make one up in a hurry. Official. I'm the Mayor here, and District Governor."

"This thing is a menace to every man, woman, and child in the settlement," Crewe snapped. "My job is to prevent tragedy—"

"Forget Bobby," Blauvelt cut in. He waved a hand at the jungle wall beyond the tilled fields. "There're a hundred million square

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miles of virgin territory out there," he said. "You can do what you like out there. I'll even sell you provisions. But just leave our mascot be, understand?"

Crewe looked at him, looked around at the other men.

"You're a fool," he said. "You're all fools." He turned and walked away stiff-backed.

In the room he had rented in the town's lone boardinghouse, Crewe opened his baggage and took out a small, gray-plastic cased instrument. The three children of the landlord who were watching from the latchless door edged closer.

"Gee, is that a real star radio?" the eldest, a skinny, long-necked lad of twelve asked.

"No," Crewe said shortly. The boy blushed and hung his head.

"It's a command transmitter," Crewe said, relenting. "It's designed for talking to fighting machines, giving them orders. They'll only respond to the special shaped-wave signal this puts out." He flicked a switch and an indicator light glowed on the side of the case.

"You mean like Bobby?" the boy asked.

"Like Bobby used to be." Crewe switched off the transmitter.

"Bobby's swell," another child said. "He tells us stories about when he was in the war."

"He's got medals," the first boy said. "Were you in the war, Mister?"

"I'm not quite that old," Crewe said.

"Bobby's older'n grandad."

"You boys had better run along," Crewe said. "I have to . . ." he broke off, cocked his head, listening. There were shouts outside; someone was calling his name.

Crewe pushed through the boys and went quickly along the hall, stepped through the door onto the boardwalk. He felt rather than heard a slow, heavy thudding, a chorus of shrill squeaks, a metallic groaning. A red-faced man was running toward him from the square.

"It's Bobby!" he shouted. "He's moving! What'd you do to him, Crewe?"

Crewe brushed past the man, ran toward the plaza. The Bolo appeared at the end of the street, moving ponderously forward, trailing uprooted weeds and vines.

"He's headed straight for Spivac's warehouse!" someone yelled.

"Bobby! Stop there!" Blauvelt came into view, running in the machine's wake. The big machine rumbled onward, executed a half-left as Crewe reached the plaza, clearing the corner of a building by inches. It crushed a section of boardwalk to splinters, advanced across a storage yard. A stack of rough-cut lumber toppled, spilled across the dusty ground. The Bolo trampled a board fence, headed out across a tilled field. Blauvelt whirled on Crewe.

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"This is your doing! We never had trouble before—"

"Never mind that! Have you got a field car?"

"We—" Blauvelt checked himself. "What if we have?"

"I can stop it—but I have to be close. It will be into the jungle in another minute. My car can't navigate there."

"Let him go," a man said, breathing hard from his run. "He can't do no harm out there."

"Who'd of thought it?" another man said. "Setting there all them years—who'd of thought he could travel like that?"

"Your so-called mascot might have more surprises in store for you," Crewe snapped. "Get me a car, fast! This is an official requisition, Blauvelt!"

There was a silence, broken only by the distant crashing of timber as the Bolo moved into the edge of the forest. Hundred-foot trees leaned and went down before its advance.

"Let him go," Blauvelt said. "Like Stinzi says, he can't hurt anything."

"What if he turns back?"

"Hell," a man muttered. "Old Bobby wouldn't hurt *us* . . ."

"The car," Crewe snarled. "You're wasting valuable time."

Blauvelt frowned. "All right—but you don't make a move unless it looks like he's going to come back and hit the town. Clear?"

"Let's go."

Blauvelt led the way at a trot toward the town garage.

The Bolo's trail was a twenty-five foot wide swath cut through the virgin jungle; the tread-prints were pressed eighteen inches into the black loam, where it showed among the jumble of fallen branches.

"It's moving at about twenty miles an hour, faster than we can go," Crewe said. "If it holds its present track, the curve will bring it back to your town in about five hours."

"He'll sheer off," Blauvelt said.

"Maybe. But we won't risk it. Pick up a heading of 270°, Blauvelt. We'll try an intercept by cutting across the circle."

Blauvelt complied wordlessly. The car moved ahead in the deep green gloom under the huge shaggy-barked trees. Oversized insects buzzed and thumped against the canopy. Small and medium lizards hopped, darted, flapped. Fern leaves as big as awnings scraped along the car as it clambered over loops and coils of tough root, leaving streaks of plant juice across the clear plastic. Once they grated against an exposed ridge of crumbling brown rock; flakes as big as saucers scaled off, exposing dull metal.

"Dorsal fin of a scout-boat," Crewe said. "That's what's left of what was supposed to be a corrosion resistant alloy."

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They passed more evidences of a long-ago battle: the massive, shattered breech mechanism of a platform-mounted Hellbore, the gutted chassis of what might have been a bomb car, portions of a downed aircraft, fragments of shattered armor. Many of the relics were of Terran design, but often it was the curiously curved, spidery lines of a rusted Axorc microgun or implosion projector that poked through the greenery.

"It must have been a heavy action," Crewe said. "One of the ones toward the end that didn't get much notice at the time. There's stuff here I've never seen before, experimental types, I imagine, rushed in by the enemy for a last-ditch stand."

Blauvelt grunted.

"Contact in another minute or so," Crewe said.

As Blauvelt opened his mouth to reply, there was a blinding flash, a violent impact, and the jungle erupted in their faces.

The seat webbing was cutting into Crewe's ribs. His ears were filled with a high, steady ringing; there was a taste of brass in his mouth. His head throbbed in time with the thudding of his heart.

The car was on its side, the interior a jumble of loose objects, torn wiring, broken plastic. Blauvelt was half under him, groaning. He slid off him, saw that he was groggy but conscious.

"Changed your mind yet about your harmless pet?" he asked, wiping a trickle of blood from his right eye. "Let's get clear before he fires those empty guns again. Can you walk?"

Blauvelt mumbled, crawled out through the broken canopy. Crewe groped through debris for the command transmitter—

"Good God," Blauvelt croaked. Crewe twisted, saw the high, narrow, iodine-dark shape of the alien machine perched on jointed crawler-legs fifty feet away, framed by blast-scorched foliage. Its multiple-barreled micro-gun battery was aimed dead at the overturned car.

"Don't move a muscle," Crewe whispered. Sweat trickled down his face. An insect, like a stub-winged four-inch dragonfly, came and buzzed about them, moved on. Hot metal pinged, contracting. Instantly, the alien hunter-killer moved forward another six feet, depressing its gun muzzles.

"Run for it!" Blauvelt cried. He came to his feet in a scrabbling lunge; the enemy machine swung to track him . . .

A giant tree leaned, snapped, was tossed aside. The great green-streaked prow of the Bolo forged into view, interposing itself between the smaller machine and the men. It turned to face the enemy; fire flashed, reflecting against the surrounding trees; the ground jumped once, twice, to hard, racking

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shocks. Sound boomed dully in Crewe's blast-numbed ears. Bright sparks fountained above the Bolo as it advanced. Crewe felt the massive impact as the two fighting machines came together; he saw the Bolo hesitate, then forge ahead, rearing up, pushing the lighter machine aside, grinding over it, passing on, to leave a crumpled mass of wreckage in its wake.

"Did you see that, Crewe?" Blauvelt shouted in his ear. "Did you see what Bobby did? He walked right into its guns and smashed it flatter'n crock-brewed beer!"

The Bolo halted, turned ponderously, sat facing the men. Bright streaks of molten metal ran down its armored flanks, fell spattering and smoking into crushed greenery.

"He saved our necks," Blauvelt said. He staggered to his feet, picked his way past the Bolo to stare at the smoking ruins of the smashed adversary.

"*Unit Nine five four of the Line, reporting contact with hostile force,*" the mechanical voice of the Bolo spoke suddenly. "*Enemy unit destroyed. I have sustained extensive damage, but am still operational at nine point six percent base capability, awaiting further orders.*"

"Hey," Blauvelt said. "That doesn't sound like . . ."

"Now maybe you understand that this is a Bolo combat unit, not the village idiot," Crewe snapped. He picked his way across the churned-up ground, stood before the great machine.

"Mission accomplished, Unit Nine five four," he called. "Enemy forces neutralized. Close out Battle Reflex and revert to low alert status." He turned to Blauvelt.

"Let's go back to town," he said, "and tell them what their mascot just did."

Blauvelt stared up at the grim and ancient machine; his square, tanned face looked yellowish and drawn. "Let's do that," he said.

The ten-piece town band was drawn up in a double rank before the newly mown village square. The entire population of the settlement —some three hundred and forty-two men, women and children— were present, dressed in their best. Pennants fluttered from strung wires. The sun glistened from the armored sides of the newly-cleaned and polished Bolo. A vast bouquet of wild flowers poked from the no longer sooty muzzle of the Hellbore.

Crewe stepped forward.

"As a representative of the Concordiat government I've been asked to make this presentation," he said. "You people have seen fit to design a medal and award it to Unit Nine five four in appreciation for services rendered in defense of the community above and beyond the call of duty." He paused, looked across the faces of his audience.

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"Many more elaborate honors have been awarded for a great deal less," he said. He turned to the machine; two men came forward, one with a stepladder, the other with a portable welding rig. Crewe climbed up, fixed the newly-struck decoration in place beside the row of century-old battle honors. The technician quickly spotted it in position. The crowd cheered, then dispersed, chattering, to the picnic tables set up in the village street.

It was late twilight. The last of the sandwiches and stuffed eggs had been eaten, the last speeches declaimed, the last keg broached. Crewe sat with a few of the men in the town's lone public house.

"To Bobby," a man raised his glass.

"Correction," Crewe said. "To Unit Nine five four of the Line." The men laughed and drank.

"Well, time to go, I guess," a man said. The others chimed in, rose, clattering chairs. As the last of them left, Blauvelt came in. He sat down across from Crewe.

"You, ah, staying the night?" he asked.

"I thought I'd drive back," Crewe said. "My business here is finished."

"Is it?" Blauvelt said tensely.

IN TIMES TO COME

In addition to the second and concluding part of John Dalmas's tale of the neovikings and The Yngling, next issue brings an unusually realistic story by Colin Kapp, of a fighting robot that isn't really a robot . . . or . . . well, it's a little hard to say what it is. There comes a time, as automatic controls advance and the technology improves, as remote controls and servomechanism technology is refined, when it's harder and harder to say "This is a man with prostheses," or "This is a robot with some organic sensor devices built in," or even "This is a romote-control remote manipulating device for operation in an area too inhospitable for human life."

"Gottlos" was the brand name, the type-name of one design—but just what it should be called is something you can decide for yourself . . .

The Editor

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Crewe looked at him, waiting.

"You know what you've got to do, Crewe."

"Do I?" Crewe took a sip from his glass.

"Damn it, have I got to spell it out? As long as that machine was just an oversized half-wit, it was all right. Kind of a monument to the war, and all. But now I've seen what it can do . . . Crewe, we can't have a live killer sitting in the middle of our town—never knowing when it might take a notion to start shooting again!"

"Finished?" Crewe asked.

"It's not that we're not grateful—"

"Get out," Crewe said.

"Now, look here, Crewe—"

"Get out. And keep everyone away from Bobby, understand?"

"Does that mean—?"

"I'll take care of it."

Blauvelt got to his feet. "Yeah," he said. "Sure."

After Blauvelt left, Crewe rose and dropped a bill on the table; he picked the command transmitter from the floor, went out into the street. Faint cries came from the far end of the town, where the crowd had gathered for fireworks. A yellow rocket arced up, burst in a spray of golden light, falling, fading . . .

Crewe walked toward the plaza. The Bolo loomed up, a vast, black shadow against the star-thick sky. Crewe stood before it, looking up at the already draggled pennants, the wilted nosegay drooping from the gun muzzle.

"Unit Nine five four, you know why I'm here?" he said softly.

"*I compute that my usefulness as an engine of war is ended,*" the soft rasping voice said.

"That's right," Crewe said. "I checked the area in a thousand-mile radius with sensitive instruments. There's no enemy machine left alive. The one you killed was the last."

"*It was true to its duty,*" the machine said.

"It was my fault," Crewe said. "It was designed to detect our command carrier and home on it. When I switched on my transmitter, it went into action. Naturally, you sensed that, and went to meet it."

The machine sat silent.

"You could still save yourself," Crewe said. "If you trampled me under and made for the jungle it might be centuries before . . ."

"*Before another man comes to do what must be done? Better that I cease now, at the hands of a friend.*"

"Good-bye, Bobby."

"*Correction: Unit Nine five four of the Line.*"

Crewe pressed the key. A sense of darkness fell across the machine.

At the edge of the square, Crewe looked back. He raised a hand in a ghostly salute; then he walked away along the dusty street, white in the light of the rising moon. ■

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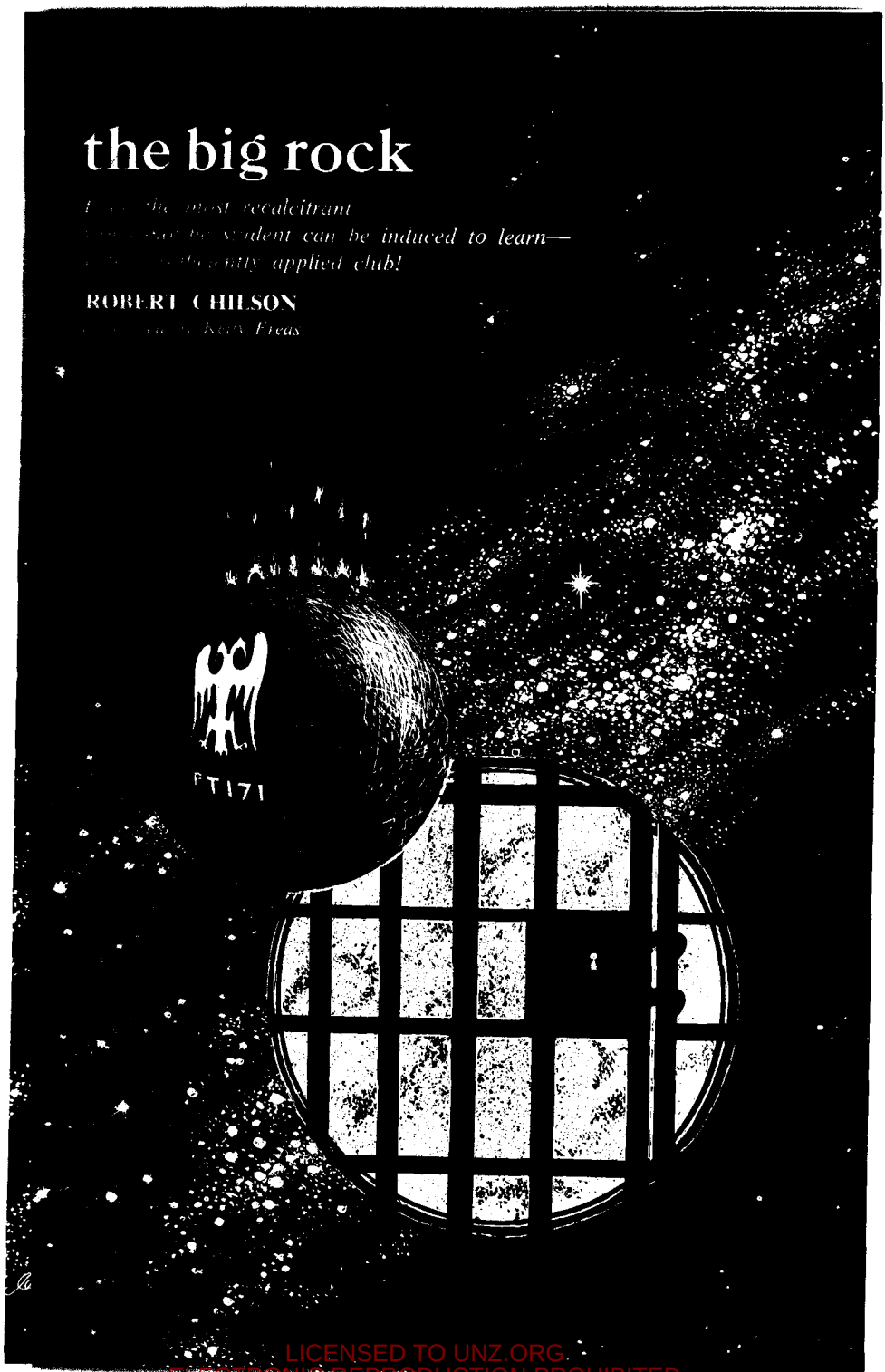
the big rock

How the most recalcitrant
[illegible] student can be induced to learn—
[illegible] ably applied club!

ROBERT CHILSON
[illegible] Key Freas



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After a week in the hold of the convict ship, Loach was getting hole-happy. It affected all the felons in the twelve-man ward, Hargrave perhaps least of all, as he had no hope, but Loach was the worst. The big brown man with the dark green eyes was cunning rather than intelligent, and inaction cut deeply into his reserve of patience. Hargrave knew that the *Llagniappe* would go to Janeiro from Wallachia to load more prisoners before spacing out for the Rock, so the trip would take at least a week on overdrive, even if they didn't go on to Rockefellia, or Connacht, for still more prisoners. But it would not have been safe to mention that possibility to Loach. The other had beaten him, Hargrave, thoroughly but judiciously during the third night of their processing on Wallachia; not for any reason, just to assert his superiority. Hargrave had followed his orders as quickly as he could jump ever since.

Unable to do anything, ragingly suspicious of the good faith of the Administrators of the Penal Department, Loach withdrew into periods of sullen brooding, from which he invariably emerged in a vicious mood. So far there'd been no trouble in the long, narrow ward, mostly because of the baron of the ward—a slender, catlike man named Witkin. He had avoided a clash with Loach without sacrificing any of his dignity. If not, Loach would have been the new baron.

It was in one such mood that Loach began to drive a quarrel with a tough young nail called Clinton. A fight was the inevitable outcome unless Witkin intervened. A number of the other nails joined in the shouting and the crimworld element split up into two camps. The kewpies present, Hargrave among them, sat on their bunks, white-faced.

Witkin paid no attention to the fight developing behind him; he lounged by the thirty-foot-long, transpex wall of the front of the ward, looking idly into the identical ward opposite. An occasional glance by one or the other of the nails caused Hargrave to remember the guards. Llango Combine supplied the guards in its ships, as none of the six planets of the Penal Union cared to spare the men. But they were still leeches to the crimworld.

Hargrave felt ill as he remembered the fight during the second day of processing. The police had tried to break it up, and the nails had all turned on them and nearly killed several. Of course there was nothing more they could do to a nail after having sentenced him to deportation. Hargrave had been terrified all the time he was with them, knowing that there were no more restraints.

And now they were forcing the guards to appear, to enter their ward. The fight had not actually gone beyond the shouting phase

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when the guard appeared, the first they had seen since entering the ship. He was wearing the black and gold of Llango Combine instead of the mist-gray of the foot-patrol and prison-guard of Wallachia, and approached so silently that Hargrave hadn't noticed him at first. Guards ordinarily shouted and banged with their clubs to break up a fight, entering a ward only as a last resort. They were, of course, forbidden to use "physical or verbal brutality," and too free use of the club could earn them a demerit at least. This one, however, was not wearing a club. Just two beamers. After a moment he was joined by another guard.

The two of them stood by a yard-wide slot in the transpex, a slot closed with slender bars. Neither man spoke, but one kept tapping his pistol-butt gently; both eyed the shouting felons coolly, detachedly. Waiting for fighting to actually start. With a sudden chill, Hargrave realized that they were out of the limits of Wallachia and that Llango was sovereign aboard its own ships. It had never occurred to him before that civilized men might have different ways of handling uncivilized men, but he began to realize how Llango Combine was able to transport canalized felons so cheaply.

The shouting degenerated into a series of growls as the nails also realized that these were no ordinary cossacks. Hargrave was a little surprised that they should realize it so quickly; he himself still had not brought himself to fully realize that they would actually fire into a ward of unarmed men.

The nails dropped into a sullen, dangerous mood after this, and the few kewpies there walked very softly indeed. A sleep and a meal later and Hargrave was as relieved as any at the ear-popping pressure drop that heralded their arrival. The gloom of the wards evaporated with a whoop as the felons crowded out the now-open doors and began to retrace their winding path into the transport. They were babbling loudly of their joy at leaving all leeches and admen and kewpies behind. Hargrave went dazedly, like a man going to his execution, which he probably was, he thought.

The port was unguarded, and there were no men prodding them along. Few of them wanted to stay, and everybody knew that the hold would be airless on the return trip. There was a slight elevator sensation as Hargrave stepped onto the crude platform beyond the port; he scarcely noticed it, though he knew Alcatraz had only eighty-five percent of Standard gravity. He was looking through the transparent canopy at the airless waste of the Big Rock.

Administrator Ickes shook hands with the man from Gaul, taking in the pearl-gray dress uniform with the congruency sign in the gleam-

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ing circle over the heart. "Captain Stinnett, of Correlation Service?" he asked. "I understand that your purpose here on Wallachia is to set up a planetary base."

The captain, an expressionless young man, not yet half a century old, took the seat indicated, accepted the glass of seonana and sipped appreciatively. It could not be grown on Gaul and was rather expensive there. "That's right," he said. "You understand, planetary bases are temporary only. It shouldn't take more than a decade or so to make copies of all Wallachia's records and to run the surveys and censuses we'd like to have. It shouldn't take any longer to dig through your planetary history and reduce that to a comprehensive pattern. We're always interested in technology, of course—not industrial secrets, you understand. But right now we're especially interested in social technology, human engineering techniques."

"Specifically, our penal program."

"Check. Of course, many planets near the frontier colonize new worlds, and that will solve an astonishing number of social problems, but your deportation of felons may well be unique. In fact, Correlation is so interested that I've been directed not merely to set up planetary bases in this part of Gaul sector, but to bring back a preliminary report on the program."

"Administrator Leston indicated that you'd want the full history of the program."

"That may take a little time, since there are six planets involved. Of course, I'll not be back to Gaul for maybe a year, depending on ship connections. The preliminary report is not concerned so much with how you came to adopt the program, but with the actual mechanics. That would be, the crime rates before and after, how you select your deportees, how much equipment you give them, the environment of Alcatraz. The number of felons deported, estimated present population of Alcatraz, and all you know of conditions there."

"I see. Well, that won't be so difficult. I can have that sort of thing whipped up before you leave. Will you be coming back to Wallachia before returning to Gaul?"

Stinnett hesitated. "I don't know; it partly depends on whether or not you have that report ready, partly on how long it takes to set up a base here. Wallachia is willing to finance it, and of course Correlation doesn't take much money. It's only for the purpose of simplifying the gathering of planetary data. Of course a large bank of information will be installed, and Wallachia can buy that when the base is closed. Incidentally, we'll want yearly reports on the penal program."

"That figures. But look here, the program will still be running after the base is dismantled. There are a

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lot of criminals on a high-population planet like this."

"Forward the reports to Gaul direct. You don't intend to bring the deportees back when the program ends, do you?"

"Oh, no. No, we don't intend to permit any ship to land on Alcatraz for a century. Their descendants should be more amenable to civilization then. None of the original deportees will live so long without modern medical techniques. Few even of the first generation will be alive, and none of them will still be in power. The fourth or fifth generation will be quite different from the original crimworld society; they'll evolve a more workable society under the pressure of the environment. At least, that's our theory."

"I gather you're not allowing them much in the way of equipment and technology. How many men and women do you expect to deport?"

"Our six planets have over five billion population," said the Administrator. "We estimate something less than one percent of the total; that's less than fifty million deportees in a decade. Fifty million colonists are not many, these days, for a frontier colony, but not bad for an uninhabitable planet."

"Incidentally," said Stinnett, struck by a thought, "what does 'Alcatraz' mean? It just occurred to me that it must have some significance."

Ickes nodded. "It means 'the big rock'; it comes from Earth, where it referred to a prison, back before the first star flight. It was built on the top of a bare rock mountain called Alcatraz. There was a popular audio-visual fiction record set there, issued a decade ago. One of the penologists remembered it."

"Very appropriate," said Stinnett.

Hargrave had no time for more than a glance around before he was jostled by more eager felons toward the stairway across the tower. This tower, a crude metal affair, was one of a number that had been rolled up to the globular, gold-and-black transport. Welded to the top of it was a crude plastic canopy —some cheap silicone; it definitely wasn't transpex. The stairway was a spidery metal thing with a series of hoops arching over it. Under the hoops and between the banisters was a flexible tube, a cheap, thin balloon of silicone plastic, gasketed to the canopy on the tower top.

Hargrave went down with exaggerated care, the balloon-tube making the rough metal treads slippery. The sounds of thumping feet and men's voices never quite drowned the low, ominous hiss of leaking air. He was feeling chilly despite the heat, by the time he reached ground.

Little of the planet could be seen from inside the flexible tube. It distorted the view, and the top half

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was plastic/metal alloy for protection from the sun. It led straight away from the *Llagniappe* to a more solid ring-shaped tube of the same rigid plastic as the tower canopy, completely circling the transport. A dozen and a half of the flexible tubes led from bulging ports in the ring's side to towers against the ship. Hargrave was swept around the port ring and into a large dome tangent to it by the thousands of boisterous felons.

This dome was a hundred yards or more across, crowded with new arrivals. Hargrave almost ran into Loach when the big man stopped. "Vadie! Hey, Vadie Flemm!" Loach roared, drowning nearby conversations.

The woman in question looked around coolly, smiled suddenly at Loach. Hargrave she did not see. She was a rather tall, shapely redhead, carrying her blouse in the heat of the dome. She had a hard, glossy beauty, a chrome-plated appearance that did not detract from an impression of hard, self-serving competence. Hargrave was rather afraid of her. She seemed much more dangerous than the other women in the dome.

He did not catch their greetings; he was too miserable. She handed Loach her blouse to hold, a mark of favor, and he promptly passed it to Hargrave, a mark of submission. Hargrave stood behind them, holding the blouse and feeling both lost and thoroughly out of place, as if at a family reunion or a convention of strangers. He watched the new arrivals moving back and forth, grouping and breaking up, wishing for his wife for the first time in years.

He had not cared for her since a year after their marriage; it was her social ambitions that put him here. He had come close to hating her these last couple of years, but now he was utterly alone. Everyone else here was happy, it seemed. He had not felt this way since he was eight—when he got lost.

He became aware suddenly that Witkin was looking at them. To his surprise, the catlike nail caught his eye and gestured him over. Hargrave looked apologetically at Loach and his woman, hesitantly laid the blouse down behind them, and crossed over to Witkin. The other stared sardonically at the unconscious Loach for several seconds, motioned Hargrave to follow him.

"Fool!" Witkin snorted, heading toward the opposite side of the dome. "There's another," nodding toward Clinton, who had a slender, teen-age blonde in tow. "The guy that steers the ship picks the landin' place. This is somebody else's preserve, and they take first pick of the flotsam."

"I see you've allowed your tail to break up," ventured Hargrave.

"Muscle! Nothin' but foron-brained muscle, plenty more around like 'em. You, you're diff.

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You got somethin' in your head. You know a lot of things I can use to know. I got brains, but you got nuggets. I can use you."

They came up to a little crowd around one of the air locks. Several men here were dressed in coarse, shapeless pants and tunic, apparently of undyed cloth. They wore armbands, the only colored cloth about them, and an air of authority. They were dividing up the new arrivals into groups under the charge of spacesuited men who led them off and hustled them into suits. The women were being led off to another dome, or group of domes; their suits were brought back in wheelbarrows. The men were put to work outside.

Witkin caught the eye of one of the men and they found themselves under the orders of a tough-looking, black-haired man with a broken nose and the name of Omara. The suits were very crude, obviously handmade, woven fiber glass set in a flexible silicone-plastic metal alloy binder, the whole then chrome-plated. The chrome was now wearing off, and Hargrave, dismayed, found frayed places in the fabric.

He climbed awkwardly into the heavy thing, trying to ignore the odor of it, anxious to avoid the withermgly contemptuous notice of Omara. The Connachta had told them that he'd explain the suits once; if they didn't get it then, they were dead. Hargrave concentrated painfully on all the details.

He was weak with fear of the suit by the time he had laced up the front. The seal here consisted of a flexible tongue held against the lashings by air pressure. Apparently the crimworld on Alcatraz would not make seal crystals, those ladderlike giant molecules that split lengthwise at the touch of just the right electric current, generated by piezoelectric crystals. He had never heard of any other kind of clothing fastener or door latch. The helmet was not quite as bad. It was hinged at the back and snapped into place over a foam ridge which was forced against it by air pressure.

Suited but for their helmets, the group clustered around Omara, somewhat subdued; the nails were not afraid of any man, but the Rock was enough to daunt anyone. "Aw right," growled the Connachta, "you've got'em on, but that ain't enough. You gotta know'em inside out. That's your life you got on your back." He gave them a brief, pungent explanation of how the suits worked.

The chief power source was the worker and the sun. Thermoelectric alloy wires were wrapped around the cloth inner liner and delivered their power to a bulky battery pack, a box hooked to the front of the suit. It supplied power to the com circuit and to the air purifier, a crude plate-style electro

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synthesizer plugged in at the small of the back. The purifier broke down carbon dioxide and more complex organic compounds, storing the carbon. A small cylinder contained enough air—they breathed a nitrox mix—to inflate the suit several times. The air purifier contained a dehumidifier and there was a reservoir in the suit.

They were warned about bends and told to equalize pressure slowly before removing the suit. If the reservoir was dry when they put the suit on, they could drink all the water they wanted; they'd only be replacing perspiration losses. These suits had no other plumbing—Hargrave's nose had told him that. If the suit began to cool off, they had to get into the sunlight quickly, because the lithair cells breathed air and had to be constantly charged by the suit's heat.

"Now get this, you kewpies. It ain't no picnic here." Omara looked fiercely from man to man. "We all gotta work, and I mean work, or we all starve, and I mean starve. Catch you snorin' around, a week without work, and out you go." He gestured toward the air lock significantly. "We work ten hours a day here," he growled. "One credit per hour. Take a credit to pay for your den in a ward, another couple credits for food, and five credits rent on them suits. The suit is worth a thousand credits, so you got no plaint. Got all that?" There was no reply.

"Aw right then, let's go." Omara reached back, grasped his helmet by the sturdy antenna loop, and rammed it down over the seal. The rest followed suit and crowded after him into the air lock, some twenty of them. There was just room for all of them in the bulky suits. They stood silently for the longest time as the pumps slowly pulled the air out of the lock, listening to the pumps, then to each other's breathing as the pump sound faded. Hargrave strained his ears for the ominous hiss of leakage but was not reassured by the absence of the sound.

Then the outer lock opened and spilled them out on the naked Rock.

"Well," said Ickes, hesitating, "you understand that Alcatraz itself is immaterial. Any marginal planet will do. It just happened that it was airless. The actual figures I was never much interested in; I don't remember them well."

"Just hit the high spots, then," said Stinnett.

"Well, the planet is airless, has about eighty-five percent of Standard gravity, and a comfortably short rotation. A weak magnetic field, but strong enough to turn most of its sun's charged particles. Background radiation is several times normal but no problem. The primary is hot and fierce with particles, but it's quite a ways off—a dimensionless point in the sky.

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There is a faint wisp of air, dense enough to stop most small meteorites. It has radiation belts and an ionosphere, but both are pretty weak."

"That wisp of atmosphere," said Stinnett keenly. "What is it? Also, how thick is it?"

Ickes began to suspect that the Correlation captain had seen space service. He shrugged. "I understand that it's mostly oxygen and nitrogen, which they tell me is strange. It's about a millionth Standard, or something like that. I know that a lot of usually space-borne industrial processes can be carried out on the surface. I don't know the exact figures. I'll have to introduce you to Fallon or one of the other planetologists."

"I'm not sure I have the time, though I'd like to. There must be reports on Alcatraz in the literature; locate some for me and I'll read them on ship."

"All right. As I say, the environment is immaterial to the experiment. You understand, of course, that we've given them the bare amount of equipment and materials to enable them to survive. There was a political problem here and on all the planets of the Union; we have a powerful minority of vocal liberals. Anarchist is maybe a better name. They're very strong against the coercion of the individual by the State, and completely blind to the clear fact of the coercion of individual by individual.

"Taxes are high already, Rehabilitation was expensive and inefficient, and its use was limited by the liberals' protests against brainwashing. The Penal Union was founded because the Rock was the cheapest way of dealing with the crimworld. Since it's too expensive to provide guards and supervision, we have to leave them to build their own society, limiting their technology so that it won't come in conflict with ours. Conditions are pretty primitive there, but the average taxpayer couldn't care less. Oddly enough, the liberals don't mind either. They idealize the natural state and deplore the sapping of the spirit by the Machine on the industrialized worlds."

"So they see the crimworld as a group of happy, uninhibited noble savages, and life on Alcatraz as an epic of Man against Nature," suggested Stinnett.

"I think they actually, honestly do," said Ickes. He shook his head wonderingly.

Omara led his band of novices across the gray and brown plain toward a cluster of geodesic domes connected by rigid plastic corridors. Hargrave, glancing around, was surprised and chilled to see how few domes there were. The *Llagniappe* had landed several thousand men and women here. The transport had already gone, and he felt a wave of loss. He had an irrational feeling that they

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wouldn't be allowed to starve, though he knew they were on their own. He had heard that Morgan's city was a new one, that he had left Hung's and set up on his own only a couple of months before, but he hadn't realized how small it was. There were only half a dozen domes, counting one that was merely an inflated bubble.

A giant truck or cart stood by this dome. Hargrave stared, fascinated. It was the largest wheeled vehicle he'd ever seen. It was a full thirty feet long by ten feet wide, and the top of the bed was ten feet high, just the height of the giant wheels. The wheels were iron, wide-tired, spoked, with the tire, spokes, and hub all one unit. Omara caught the end of the tongue, bellowed them to the handholds along the tongue and to the metal cables attached to the frame. They turned their backs to the direction they were going and dug in their heels. The monstrous vehicle resisted for a moment, then moved grumblingly toward them, as if half-asleep. It was much lighter than it looked.

They turned around and heaved against the crossbars and cables, staggering from side to side, stumbling and tripping, but moving forward. The nails were too breathless to curse at each other. Omara stopped them in the middle of nowhere, and led them back to another cart, a much smaller one stuffed full of the same flexible plastic as the bubble dome. Several men took hold of this and the rest pushed one- and two-wheeled barrows full of picks and shovels.

As he plodded back across the barren plain, Hargrave pondered the primitive tools in his barrow. The whole society here was so primitive. He had been afraid of the Rock, but the physical environment hadn't frightened him, knowing it was nothing modern technology couldn't deal with. It was the crimworld itself that he feared.

They unrolled the uninflated dome, checking under it for sharp rocks, unfolded three hundred square yards of sun-power screen from the big cart, which they called a "wagon," and set up a metal ramp at one end of it. The bottom half of the bed contained a cracking unit. At the other end a flexible tube was connected to the dome. By this time another gang of men had been suited up and led over, pushing wheelbarrows full of hand tools. The whole crew were set to work digging up the sparse soil and wheeling it up the ramp to dump it into the hopper.

The cracking unit was infficient, but it was big. The dome was soon inflated. Hargrave was about ready to drop by that time, and Witkin, who had promoted himself to gang boss's assistant, put him to work hauling empty air cylinders and uninflated domes. There were two of the latter, inflated beside the first, each one of the three touching the other two. Once they were up and

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a crude temporary air lock installed, the men were led inside, a gang at a time, for a short rest and a visit to the latrine pit. There was nothing to eat or drink in the new domes, and the air was harsh and dry and hot, but Hargrave hated to leave when the short break was over.

Back outside, he was put to work again digging. He was disappointed but did not dare protest, and despite his aching muscles and the stitch in his side, he applied himself. Some of the gang bosses carried metal rods and all were ready with their boots. At first he cringed at the blows. Later, dulled with exhaustion and familiar with the sound, he did not bother to look up until he heard Loach's bull bellow. He jumped then and nearly spilled his load. He saw Omara run past, the striped arms of his suit distinct. Loach was roaring curses and swinging his shovel at a tormenter with a rod. This man almost disarmed the big man, and while he was fighting to retain his grip, Omara slapped him on the chest, shoving him back. Loach recovered and attacked, swinging. Omara and the other avoided him with the easy grace of matadors, the big man clumsy in his suit.

Loach paused then for a breath, and Hargrave distinctly heard a low, ominous whistle. The big man dropped his shovel and began to paw frantically at his chest. Omara closed in then and fumbled at the purifier at his back. Loach twisted away desperately and then, bellowing in panic, ran for the new domes. He got halfway, fell in the shadow of the sunscreens. Hargrave, horrified, saw him struggle to hands and knees, frost forming on and all around him. He fell and lay still.

Suited men closed in and Hargrave turned back to his job, sick, trying not to see them carrying the unsuited body toward the cluster of domes. He had hated and feared the big man, but that horrible death stirred him. Pity lifted him out of his apathetic fear for himself.

Time was called when the sun got too low to power the cracking unit, and several hundred men crowded into the new domes. They were utterly exhausted by the hardest work of their lives; robot work; but none of them so much as grumbled. They were learning. Even the gang bosses, despite their rods and boots, had worked hard beside them all day.

Hargrave followed Witkin and several others in the nail's new tail through the pay line. The bursar, or whatever they called him, tiredly signed and handed out chits, printed slips of paper; tokens of credit. Omara stood by him and pointed out those who had had to have their air cylinders filled during the day; that cost them an extra credit. Hargrave was one. His chit was for one credit, deducting

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the rest of the day's wage for rent and food.

The one-credit chit worried him more than all the expensive goods he'd ever owned in the past. He was used to having his credits recorded in the central records of his bank, untouchable except through his fingertips. This, he was all too aware, could be stolen. He could pass it to any other "citizen" as was, but if he used it to purchase something from the "government," it had to be signed and was canceled. It ought to at least be recorded. He began to wonder how long the society could hang together with such a crude economy.

From the bursar they went to another table, back of which was a pile of the familiar black-and-gold space packs of synthetic iron rations from the Llango Combine. They had eaten such rations all the way out. The pile was guarded by men with long knives. The officer here was wearing clothes of the same kind of synthetic fabric as the prisoners, but a rich yellow. He climbed onto the table and addressed them. "Listen ta me, ya hollow-heads. Morgan has passed the word down—one meal a day till the nex' crop comes in. Anyone tries ta buy more gets a year at hard labor on half rations. Anyone steals food, or sells extra food, takes the long walk. So don't come around me with ya credits; a dead man ain't got no use fer'em."

Under the frowning scrutiny of the guards, each of the tired workers was given one ration pack. Hargrave hoped the *Llagniappe* had left enough to last the thousands of them till the next crop was harvested. Apparently Alcatraz not only lacked gravitronics and furies, but even food synthesizers. The simple air purifiers seemed to be the crimworld's limit.

While they were eating—Witkin's tail sitting a little apart—there was a sudden explosion of shouts and curses that collapsed into a kicking tangle of three men. The guards with the foot-long knives leaped into the middle, striking with the flat, hard. A few moments later, two of the brawlers were up, glaring at each other and backing away, each with his ration pack. The third lay senseless. All were bleeding from minor cuts here and there.

"Two of 'em jumped that tall one and tried to take his ration. Morgan must mean it about the long walk," said Witkin thoughtfully. "Or he don't want his kewpies to starve. The leeches work us hard enough."

They ate in silence, Hargrave with little appetite. He felt a little ill, and kept glancing fearfully around. Water was brought in by the night shift—their suits had been taken over to the port dome, and men who had done nothing all day were put to work—and Witkin and his tail strolled over for a drink. The latrine consisted simply

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of a hole where the floor was laid over a pit; the dome was to be used as a greenhouse. When they were well away from the other nails, they gave Witkin their credit chits. Hargrave followed suit without knowing why, but rather glad to have it out of his hands. There was nothing to buy here anyway, and he realized that prices would be very high if there were.

"It ain't much," said Witkin, folding them away expressionlessly, "but it's better than nothing. I'll see if I can't get us a better deal."

They slept on the floor, fitfully. The air was stale and they were awakened several times by the night shift. Once there was a loud commotion when the night shift turned in. One man was tied up and lashed thoroughly for some offense. Hargrave curled up and tried not to count the blows, but he quivered all over at each one. Afterward he trembled for a long time before he went back to sleep. His last conscious thought was a sudden brief wonder that he was sleeping on the Rock—that he had survived the first day.

"Even our liberals had to admit that taxes were already too high," continued Administrator Ickes, sipping his cloudy blue drink thoughtfully. "We couldn't have afforded to have given them modern machines if we had wanted to. Fortunately the liberals don't mind, nor the average taxpayer. They have a lot of prejudices against misguided victims of their environments that cause the liberal pseudointellectuals a lot of pain. But few people realize what life at that low technological level is like, anyway."

"Just what is that level? I'll want a lot of detail in that report; if any other planet decides to adopt your program, they'll want full information."

"Of course. I can give you a good idea now. They get all their power from sun-power screens. They don't have ergons, we didn't give them any zerohmitics factories. They couldn't have duplicated them anyway, and they have to be able to make all their own equipment. Few people realize just what that involves. They store their energy in something called a chemical cell. It burns lithium, or sodium, or even potassium in air to generate electricity, and the reaction is reversible. Not very efficient, and they can only store about a kilowatt-hour per pound, but it works. They can make thermoelectric alloys easily, their own sunscreens, cheap silicone plastics, vacuum-refined metals—we dug up a lot of old information on metal-working—had to send to Gaul for a lot of info. We could have used Correlation's service then, if it had existed in this sector."

"That is our business. Fortunately Gaul has a lot of historical records like that—one reason we chose it for a sector base. How

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about com circuits, though, if they have no zerohmitics?"

"The old word for zerohmitics was electronics, back on pre-stellar Earth before the invention of zerohmites. In those days instruments were based on the capacitron. Even record crystals were capacitronic. They were sensitive to heat and hard radiation, but they were simple to make, especially in vacuum. That was one of the things we got from Gaul."

"I see. They will survive handily, but at practically the cave-man level. Fiber glass, asbestos, plastics, ceramics, vegetable fibers, metals. No fortalics such as foron or transpex, no primary power sources. But how long will they remain at the subsistence level before they begin to make zerohmitics? That will lead them directly to the fury, then gravitronics."

"A long time. Our liberals haven't really thought—they imagine that Alcatraz will be a normal world in a century, except for the lack of air. You know—gleaming domed cities rising above the factory-dotted plains, black sky full of airships, and so on. My guess is they'll be at about the same level they are now. Their culture will positively fight change. Any normal society requires a high percentage of men willing to spend their lives studying boring subjects and working all day at dull jobs. But such men are called 'kewpies' in the crimworld. They are there for their betters to prey on."

"They'll have to civilize themselves before they can build a civilization, in other words. But they'll have to have a certain degree of cooperation just to survive. Life on Alcatraz, for a canalized felon, should be as bad as Rehabilitation. Worse. They'll have to learn new ways of thinking, and as on any frontier world, death is the penalty for failure to learn."

Witkin woke his tail far too early the next morning. He was wearing, Hargrave saw, a pair of the coarse, shapeless pants made here, and a pair of the crude slippers; no shirt. He had obviously been up and around for quite a while. Hargrave saw that during the night a new door had been cut in the outer wall of this dome. It opened on a balloon-tube that now connected these three domes with the main cluster. Wtikin led them to it.

Once inside the tube, he said, "We're gonna change them silks you got on for baggies 'fore someone cuts all your throats. Silks cost sixty credits, retail, with shoes. Baggies cost only ten retail, with slippers. We'll get twenty credits in boot for each of ya. That'll give us a couple hundred. That's a good fist. We oughta be able to do somethin' with that."

Hargrave knew that he should feel both hopeful and grateful, but he couldn't get enthusiastic about better conditions. He was in a state

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of despair, merely drifting dully, vaguely anticipating some disaster. He had been that way ever since his first miscredited order.

Witkin led them through a maze of corridors in one of the geodesic domes to a room hung with crude clothing, much of it overused. There were several girls here, doing apparently nothing, presided over by a sour-looking middle-aged woman who looked them over silently. Witkin explained and a sullenly pregnant teen-age girl was sent after nine suits of new baggies, medium and small sizes. There were only three sizes. They changed under the indifferent eyes of the clerks while the chits were made out to Witkin. Some of the men elected to do without shirts, since that would make the fist a little larger.

They got back to the bubble-dome in time to go to work with the rest. They spent the day digging and wheeling soil for the cracking unit. It had been adjusted to refine silicon, or rather, it was the first stage of refinery. The silicon and other materials were wheeled to the plastics factory. In a day or two there'd be materials for several more new domes, both bubble and geodesic.

As Hargrave was removing his suit that night, the pressure dropped suddenly, doubling him up with agony. The air cylinder had gradually raised the suit pressure far above the dome pressure. He was not permanently injured, but he slept little that night. The next morning Witkin woke them early again. Hargrave cringed at the thought of going outside.

He was agreeably surprised, though apprehensive, when Witkin proposed to move him to space-suit manufacture in one of the geodesic domes. "Here's the script," explained Witkin, squatting in the circle of his tail. "You find a way to make 'em better or faster, see? We need suits bad, half these new nails ain't done any work since they got here; got no suits for 'em. You do all us a lotta good; and we'll get somethin' outta it. 'Course, inside work don't pay but half what outside work does, but no matter."

There was a certain amount of paper work involved, lubricated liberally with credit-chits, but in half an hour Hargrave found himself in Gang Four, under the orders if a tall, thin, stern-faced old woman who might have been headmistress of a girls' school or of a quite different establishment. Dorry promptly put him to work with a ladle and a paddle.

His job was to ladle hot metal/plastic alloy slowly onto a mandrel, paddling it smoothly over the surface of a flexible plastic Long Johns. Other men followed behind him, wrapping hair-fine glass fibers around the mandrel and gently pulling them taut. They worked up from the feet of the suit, Hargrave

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admiring the skill with which the others pulled the fibers. They almost never broke one, and they took them in bunches of two dozen. When they had finished, they went over it again. The valves and joints and seals were tied in place with the fibers and sealed around with the binder.

They finished the casings with chrome-plating and sent them out for Final Assembly: lining, wiring, and plumbing. Presently Dorry put him at the job of pulling the fibers. It took practice, but he soon developed the delicate touch needed. Apparently not satisfied, Dorry later put him to work on the seals, another job requiring delicacy and painstaking care. Men's lives depended on his skill here, as Dorry grimly pointed out.

That day they made five of the outer casings in ten hours, with a dozen men and women working. Some of these men were dreadfully twisted and crippled; bends. Others were inoffensive men, like himself, Hargrave thought; lacking initiative. The best men would naturally be outside. The women were surprisingly normal to be of the crimworld, but they were sullen and lacked the courtesy he had taken for granted on the job on Wallachia.

That night Witkin asked eagerly, "Got any ideas? I know it's kinda soon, you only been there a day, but . . ." He was wearing a yellow rag around his arm; he had been promoted to gang boss, and his tail was larger.

Hargrave explained about making the casings and linings separately and gluing them together, then connecting the wiring and plumbing. The lining should be made, he said nervously, with cooling circuits and all wiring complete, and should be pulled over the mandrel and a plastic Long Johns drawn over it. That would save one such Long Johns, since one was now drawn over the inner lining before it was glued into the casing. And a lot of time would be saved in connecting up the plumbing and wiring.

"Gang Seven's making and putting in linings," mused Witkin, striking his knee thoughtfully. "The two gangs would have to be run together." He looked at Hargrave thoughtfully, shook his head. "No, Gravy, you ain't got it. I can't hear Ling puttin' you in charge of two gangs and you only here three days. How about this Dorry female? She got the juice to handle two gangs? Would she listen to you if you was her assistant?"

Hargrave thought it over and nodded. She had kept moving him around to more skilled jobs. She had left him on the seals because he was good at it. Anyone so particular and so knowing of her men would make a good boss for Final Assembly. He told Witkin so.

The other nodded. "We'll put it up to Ling, the suit baron, tonight,"

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he said. "He'll know her and'll trust her at it. And your idea makes sense. He'll go for it. It'll take most of our fist, but we can throw him. C'mon. Gravy."

"It isn't so much that they have to learn new ways of thinking," said Ickes, pursing his lips thoughtfully. "It's more that they'll have to learn self-control. Most members of the crimworld are unable to take any interest in anything outside themselves or their desires. They are incapable of holding down a job for that reason; they invariably slight small details. On the Rock, life itself depends on incessant checking of minor details. Those genuinely incapable of it will undoubtedly die. Those capable of adapting will have every motivation for doing so, motivation not found in the permissive environments they came from. We have no figures of course, but accidents due solely to carelessness must be the most common cause of death there."

"That will teach them a new way of appraising each other's personalities, too," observed Stinnett. "He may be a good—what do they call it?—a hard nail, smart, tough, tricky, and a good man to have at your back, but can you trust him with your life, say at the air-lock controls?"

"True. Another aspect of that low level of technology is the very large amount of boring work that has to be done. All primitive societies were that way, lacking robots and automatic devices. That has, um, therapeutic value, too. And if they do acquire any margin above that needed for survival, it will be wasted in fighting for primacy."

"What sort of work do you mean? Aren't their communities self-sufficient?"

"Well, theoretically, yes. But in practice, the air leakage is high. Not to mention water wastage. At that level, replacing air and water is a constant effort, requiring a high percentage of available manpower and capital investment. Then, too, they breathe nitrox. Between preventable and unpreventable accidents they must have a high proportion of cripples from the bends, men not capable of heavy work. At that level of medical technology, any kind of accident would leave handicapped men. Disease was eliminated by comprehensive vaccination and sterilization."

Witkin entered the washroom silently. Hargrave, gasping and sobbing and fumbling weakly with the taps, didn't know he was there till he felt his baron's arm steadying him. After a moment they were both bathing his face with the tepid, salty-tasting water. With the blood washed away, it became evident that the nose had nearly stopped bleeding. Most of the pain in the face faded.

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"You look alive," said Witkin, examining him. Hargrave slumped against the crude washbasin, legs trembling. "Now look," he admonished, "you stay away from other kewpies' blossoms if you wanna keep your head. You want a woman, O.K., I'll fix it up for you, but no more prospectin' around, see?"

"But I only stopped and talked with her for ten minutes. I didn't mean a thing," gasped Hargrave. The senseless savagery of the attack weakened him as much as the violence. He had been beaten and kicked skillfully about the abdomen and kidneys and could hardly stand.

"*You didn't mean a thing!* Look, Gravy, that kewpie couldn't care less. He gets an excuse to pulp you, you're pulp. He *likes* it, see? And so does this blossom of his, see? I know that sulfur-hound's-daughter; it makes her feel big to set him on other guys. You able to amble? C'mon, we'll miss the execution."

Mention of the execution almost made Hargrave ill again. "I . . . uh . . . I don't feel like— Maybe I'd better lie . . . uh—"

"O.K., you amble along to the ward. I'll send Vadie by with some pills."

Hargrave started a little at mention of the coolly self-sufficient redhead. "Oh, I hardly think . . . uh," he began, dreading having her find him in this state; she was already, he thought, acidly contemptuous of him, though she almost never spoke.

"As far's the pills are concerned, you're prob'ly right," grinned Witkin.

They parted, Hargrave shambling slowly off to the ward occupied by Witkin's tail. At present, Hargrave felt none of his usual pride in having brought the men in from outside and in tripling suit production. They were doing much better since they no longer had to pay spacesuit rentals. Witkin had been appointed director of spacesuit manufacture, Ling promoted to Domemaster, Hargrave himself made gang boss of Final Assembly; all because of him. What it got *him* was a battered face and an ache all over his slight body. In the past week he had gotten on so well that, though never happy, he was almost content. He had never forgotten that he was on the Rock, but he had forgotten that he was in Hell.

No one noticed him particularly, a fact for which he was profoundly grateful. He knew that he was in for some rough razzing when the others got back to the ward. He felt thankful for the execution; that should keep them all occupied for an hour.

Then a laughing, shouting mob turned into the same corridor, crowding past Hargrave without noticing him. In their midst, and the target for their jeers, were two men, hands tied behind them. One was blond and young and well-padded, though not fat; he looked

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good-natured and a little slow. Now he seemed dazed, his blue eyes open wide and turning helplessly from side to side. He looked Hargrave in the eye, to his horror, but without seeing him.

The other man was Clinton. He was the primary target of the crowd's thrusts. He fought and kicked and struggled every step of the way, constantly shouting and cursing, desperation and hysteria in his voice. After a minute or so the men and crowd were gone, but the memory would stay with Hargrave all his days.

He staggered on to the ward and collapsed on his pallet, giving himself up to the greatest wave of loneliness and homesickness he had yet experienced. He came very near weeping, but choked the tears back. Though he was responsible for their present good fortune, the rest of Witkin's tail rather despised him as a weakling already. Even his baron did not have much respect for him, though Witkin had benefitted more from Hargrave than anyone.

He had been lying miserably there for some time when he saw Vadie Flemm enter. He started and raised up, accepted the tumbler of water and several pills.

"Look awake, accomplice," she said serenely. "You've got to testify at Ed's hearing against that whiskeyjack Wills in a couple hours, you know."

"What? Oh. Oh, yes." He sat cross-legged and managed to choke the pills down.

"You look pretty pulpy," she said critically, eyeing him. "Need anything more?"

"No, this is fine. Nothing else that can be done, anyway."

"That's right." She looked around thoughtfully. "I didn't know you were still in the ward with the rest of Ed's muscle. You're not muscle, you're brain. You should have a room of your own. I'll speak to him about it. It must've slipped him. Especially if he's going to fix you up with company."

Hargrave started again. "Oh no, tell him not to bother. I'm doing fine. I was just talking to her," he began awkwardly.

"If you earned it, take it. What else can you spend your credit for here?" she said. "You're sure not being overpaid as it is. She'd not be a permanent fixture like me." She said that quite naturally. She was the first luxury Witkin had moved into his suite. "Well, be there in a couple hours," she finished.

That diverted his attention. "Do you think Wills will be, uh . . . executed?" he asked fearfully.

"Just for altering a credit chit? Ed did that all the time. How do you suppose he made it so far so fast? But he changed a couple from five to fifty. That was stupid. Ed will give him a couple dozen lashes to teach him to think, and attach his pay for a month. If it had only been fifteen, he wouldn't have said

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a thing. That hundred came out of his fist, you know, and he either has to get it back out of Ling, or work it out of Wills. We all have to live, and fifteen credits once in a while is nothing, but a few inkjacks like Wills will wreck the city. The rest of 'em mustn't get any ideas. Enough is too much. You be there."

"I hadn't realized that conditions on Alcatraz were so hard," said Stinnett thoughtfully. "What would happen if the actual facts were made common knowledge on your member planets?"

Ickes smiled sourly. "There'd be an immediate outcry to end the experiment and bring the poor misguided fellows home. I doubt if that would be done; too expensive. And many of them wouldn't want to come. The average citizen would pay little attention to the static; having consigned the crimworld to oblivion, they'd not be willing to reconsider the problem. Still, our work would be hampered by investigating committees, and few felons would be sentenced to the Rock."

"Your various governments would have to decide, and their first question would be, how effective is the program? Have crime rates dropped much?"

"As a matter of fact, they have, but not as much as we'd hoped. The basic crimworld infrastructure has been reduced to a mere shadow of itself. It's much easier to get convictions these days. We began by deporting all we couldn't Rehabilitate, then we deported all second offenders or above, and now we're deporting first offenders. The crimworld has lost most of its spindrift, those nails not actually a part of the society and not subject to its protection. Eliminating most of our recidivists actually cut the rate by a quarter. It had been going up before. Then we began to deport first offenders; that included most of our non-crimworld felons. Supposedly honest men, I mean, who steal because temptation is there, the weak-willed or thoughtless ones who divert or forestall goods, short-sell, or miscredit orders without thinking of the consequences. That cut the rate by another tenth. Our society has become much less permissive in such matters, and these weaklings and thoughtless fools are hesitating, thinking it over."

"Hm-m-m, yes. Those are the ones who only see the law as a system that protects them from their fellowman. Few even supposedly civilized men realize that it works both ways. They never imagine that they themselves might end up on the Rock; they'd be much less complacent about conditions there if they did."

"It wouldn't matter if the liberals and the average taxpayers got together and shipped all our felons to some paradise of a planet. As I said before, they make their own misery; the environment of the

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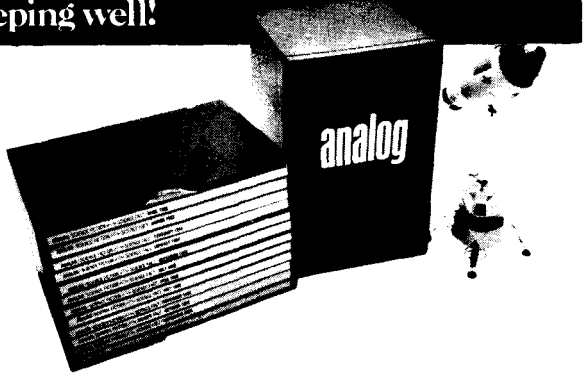

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Rock has nothing to do with it. Many of the weaklings we send there, both the crimworld element and the 'honest' ones, do not understand any kind of society. The honest ones only obeyed the law out of fear anyway. Alcatraz is a good place for them; the consequences of disobedience of the rules of society are spelled out plainly there, and any community that becomes lax in enforcing them will die."

"Granted such a hard and fast set of rules," mused Stinnett, "protection from themselves and others like them, mightn't such people be fairly happy? And I wonder if you haven't been oversimplifying when you state that the crimworld won't advance any in a century. They may be more adaptable than you think, especially with all those civilized weaklings among them."

Ickes shrugged. "Time will tell, of course. This is just an experiment. But there are so many crimworld nails, and they are so dominating, that they will stamp their pattern on the society of Alcatraz. And as for that idea of being happy on the Rock . . ." he grinned faintly. "The chief torture in Hell lies not so much in the presence of the imps, but in the company of all those other sinners." ■

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by Dean Wilson

proton to proton

The original solar cells, trapping solar energy for desired work, now appear to be remarkably similar in essence to the very recent human invention—except smaller, infinitely cheaper, and some 4,000,000,000 years older!

The proper place to begin this essay is somewhere near the center of the sun. Since I am a biochemist, I have never written about the sun before, and may never again. Therefore I looked up lots of solar statistics and feel like unloading this considerable mass of data. Here is as good a place as any, and it may even help give perspective to the rest of the material, which is mainly about protons and chloroplasts.

In the sun, protons are colliding and fusing continuously in a complex series of nuclear reactions. Six protons enter the reaction and four of these fuse to form a helium nucleus. Two protons are released during the reaction, together with two neutrinos and gamma rays. The net result is that four protons fuse to produce one helium 4 nucleus which is slightly—0.71 percent—less massive than the original four protons. Every second of every year for the past five billion years, 657 X 10^6 tons of protons have fused to form 652.5 X 10^6 tons of helium in the sun. The extra 4.5 X 10^6 tons are turned into energy

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which radiates away and is lost forever in space. About 3.8 X 10^{23} kilowatts are produced by the sun, and, of this 1.4 X 10^{14} kilowatts are intercepted by the earth. Most of this re-radiates into space, a surprising fact, but obvious when one considers that the earth is not, after all, heating up. A small fraction of this energy is temporarily trapped by the earth's biosystem, and in particular by green plants. This energy, one part in several trillion of the amount that originally left the sun—equivalent to a few hundred pounds of mass conversion per day—has been the energy source of the earth's entire biological history, including the paltry million or so years that man has been around.

All of this isn't really terribly interesting, I must admit. However, I did run across a few gems which are slightly more titillating:

1) In spite of the enormous apparent turmoil in the sun's nuclear reactions, a given proton enters into the fusion process only once in seven billion years. The next proton addition—to form helium 3—takes place in a few seconds, but then helium 3 twiddles its neutrons for 400,000 years before finally colliding with a second helium 3 to produce the nuclear "ash," helium 4.

2) The actual power density of the sun is really incredibly small, due to the rarified state of the reacting gases. For instance, 200 tons of solar mass are required to produce as much light as a 40-watt light bulb. The sun's brilliance arises only because it is so deep. Comparing this to the power density of human beings, each of us "shines" at a rate 10,000 times greater than a similar solar mass.

3) The equivalent solar mass-energy conversion used to run metabolic reactions for the entire human race is about 300 grams daily. Figure it out yourself: $E = mc^2$ and we use 3,000 kcal per 24 hours.

Green plants and chloroplasts.

Considerably relieved, we may proceed, literally, to greener pastures. The reaction by which plants

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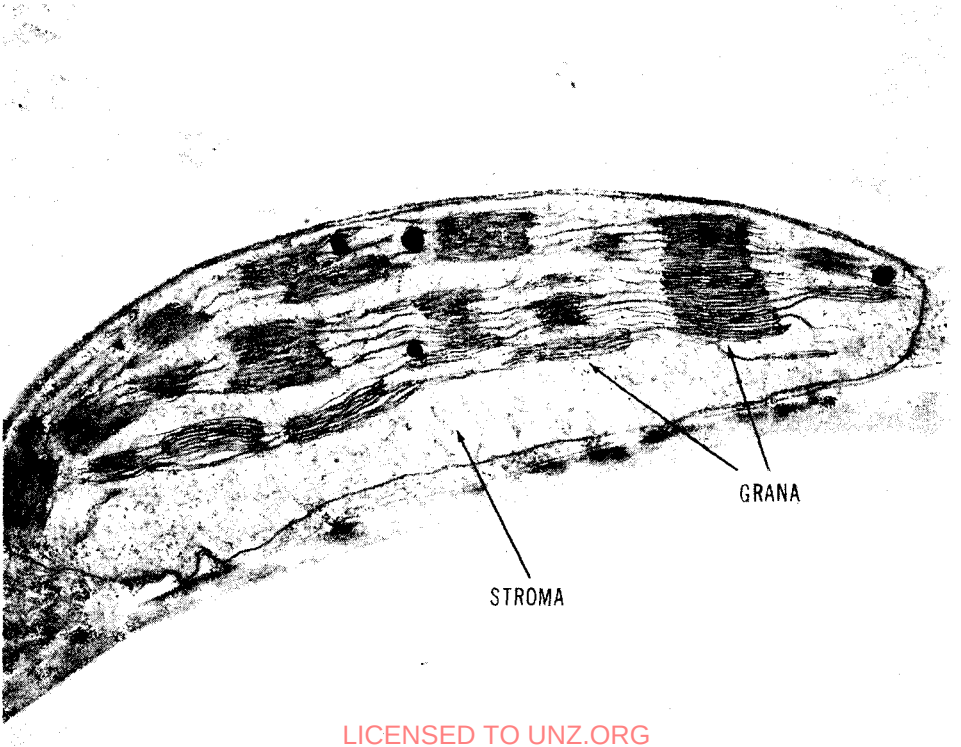
trap light energy is obviously central to our understanding of biology. Most interestingly, recent biochemical developments are suggesting that the initial energy-dependent reaction involves the transport of protons within certain sub-structures of plant cells. This suggests a very nice concept, which is the inspiration of this little essay: protons fuse into helium on the sun, releasing light energy, and nine minutes later the light causes protons to move within plant cells, with the result that energy of proton fusion on the sun is trapped for use by the earth's biosystem. All very neat and tidy.

The plant sub-structures mentioned above are called chloroplasts, and most plant cells have a few to several hundred floating in their cytoplasm. Let's look at chloroplast structure for a moment. Figure 1 is an electron micrograph of a chloroplast within a spinach cell. Only two portions of the chloroplast structure are pertinent to this discussion: grana and stroma. The grana are actually layers of membranous hollow disks stacked to form the lamellar structure seen in the micrograph. Most, if not all, of the plant's chlorophyll is located in the grana membranes, along with other light trapping pigments, lipids and a number of specialized enzymes. The other portion of the chloroplast is the stromal material, in which the grana are embedded.

FIGURE 1



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Stroma is nonmembranous and is composed of a second series of enzymes which carry out the reactions of carbon dioxide fixation.

Chloroplast reactions.

With this basic structure in mind, we can go into more detail about the functioning chloroplast. From our viewpoint as animals, the most important function of green plants is to "fix" carbon dioxide. That is, chloroplasts somehow utilize light energy to force electrons onto carbon dioxide, thus reducing it. The ultimate major product of this reaction is glucose, usually in the form of its polymer, starch:

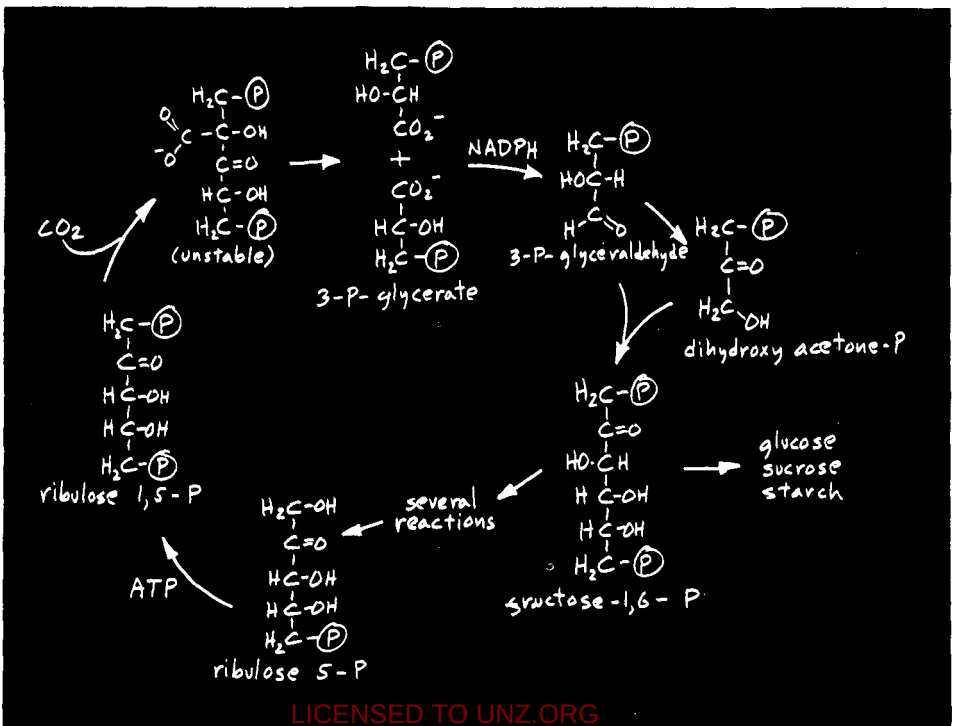
$$6\,CO_2 + 6\,H_2O \xrightarrow[\text{chloroplasts}]{\text{light}} C_6H_{12}O_6\ (\text{glucose}) + 6\,O_2$$

This is an exceedingly familiar reaction, probably recalled dimly from high school days. And about as meaningful as the reaction:

$$6\ \text{tons steel} + 1\ \text{ton glass} \xrightarrow[\text{factories}]{\text{heat}} 7\ \text{tons television sets}$$

What I want to do in the discussion that follows is to enlarge somewhat on the first reaction above. In the process I will have to reveal an embarrassing scientific mystery, but I hope to present a highly interest-

FIGURE 2



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ing and unique solution to the mystery which, if correct, will vastly broaden our understanding of biological processes. As you may have guessed, protons are very much involved.

The first point to note is that the chloroplast reaction can be broken down into two sub-reactions: dark reactions, in which carbon dioxide is fixed by reduction and which do not require light, and light reactions dependent on light energy, in which chemical energy is provided to drive the dark reactions. Happily, we do know quite a bit about the dark reactions, since these involve fairly straightforward biochemistry. The dark reaction sequence is presented in Figure 2.

It looks rather complicated at first, but only a few steps in the process are of interest here. Note that carbon dioxide fixation proceeds when a CO_2 molecule attaches itself to ribulose 1,5-phosphate and that a material called adenosine triphosphate (ATP) is necessary to drive this step. More, much more about ATP in a moment. The second point is that a compound called nicotinaminde adenine dinucleotide phosphate (NADPH) is required to reduce the breakdown products of the ribulose 1,5-phosphate-CO_2 complex. This is the reduction reaction in which electrons are added to the trapped CO_2. Finally, note that glucose is produced when a pair of 3-carbon sugars dimerize to form a 6-carbon sugar.

Adenosine triphosphate.

The dark reactions outlined above are relatively easy to understand. The catch, of course, is the source of the ATP which drives the reaction. Where does it come from? Before going into this problem in detail, we should spend a little time discussing ATP. Adenosine triphosphate is the prime source of biochemical energy for most life processes. It is involved in muscle contraction, nerve impulse transmission, protein synthesis and CO_2 fixation, to name a few. As animals, we use energy stored in sugars by plants to produce ATP for our biochemical reactions. This process, called oxidative phosphorylation, is carried out in mitochondria, the so-called powerpacks of cells. The only reason we breathe air is to supply oxygen to this process, which goes on in nearly every cell in our bodies from birth to death—from conception, come to think of it.

A structural diagram of ATP is shown in Figure 3. It is composed of one molecule of adenine—the same adenine which is involved in DNA structure—a molecule of ribose, and three phosphate groups, all linked by covalent chemical bonds. Strangely enough, the energy stored in ATP is released by the very simple reaction shown in Figure 3. A molecule of water is added to the terminal phosphate bond—hydrolysis—producing adenosine diphosphate (ADP) and inorganic

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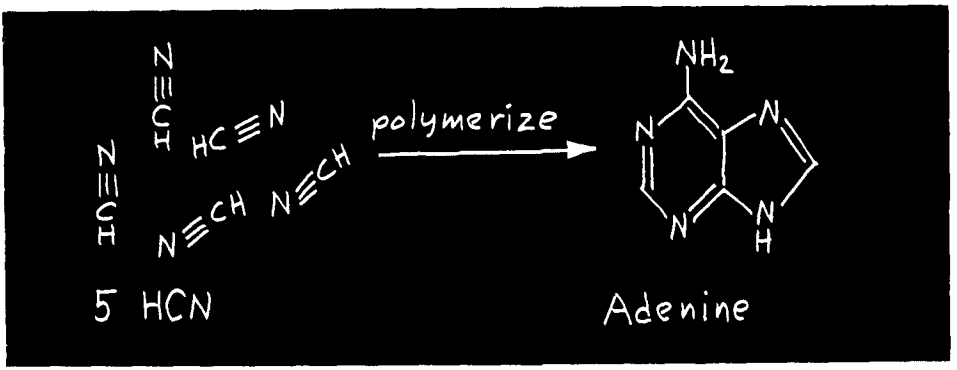
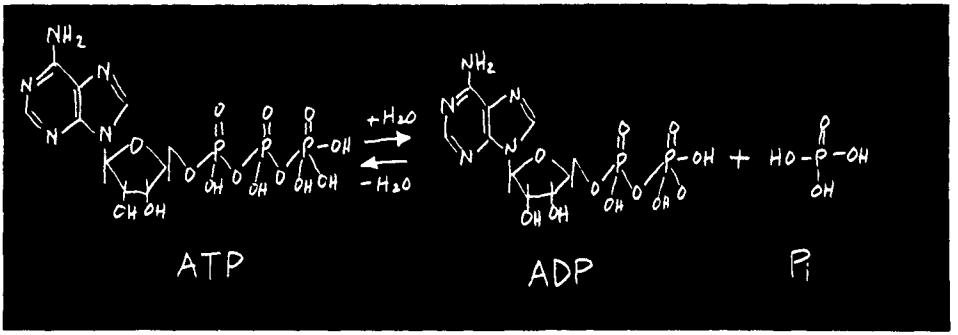


FIGURE 3

phosphate (P_i). Although this is an extremely simple reaction, the mechanism by which it is coupled to such events as muscle contraction and nerve impulse transmission is more or less a complete mystery.

One might ask, why did evolution choose an odd molecule like ATP as the primary metabolic energy store, rather than any of numerous other possibilities? This will never be answered with certainty, but it is interesting to note in passing that adenine molecules have been produced under primitive earth conditions in the laboratory by the reaction shown in Figure 4. (Primitive earth conditions are laboratory mixtures of gases presumably equivalent to the atmosphere which existed on the earth prior to the advent of life. These mixtures usually contain gases such as NH_3, CH_4, H_2O and HCN, and are subjected to an electrical arc, heating, or ultraviolet radiation to induce chemical recom-

FIGURE 4



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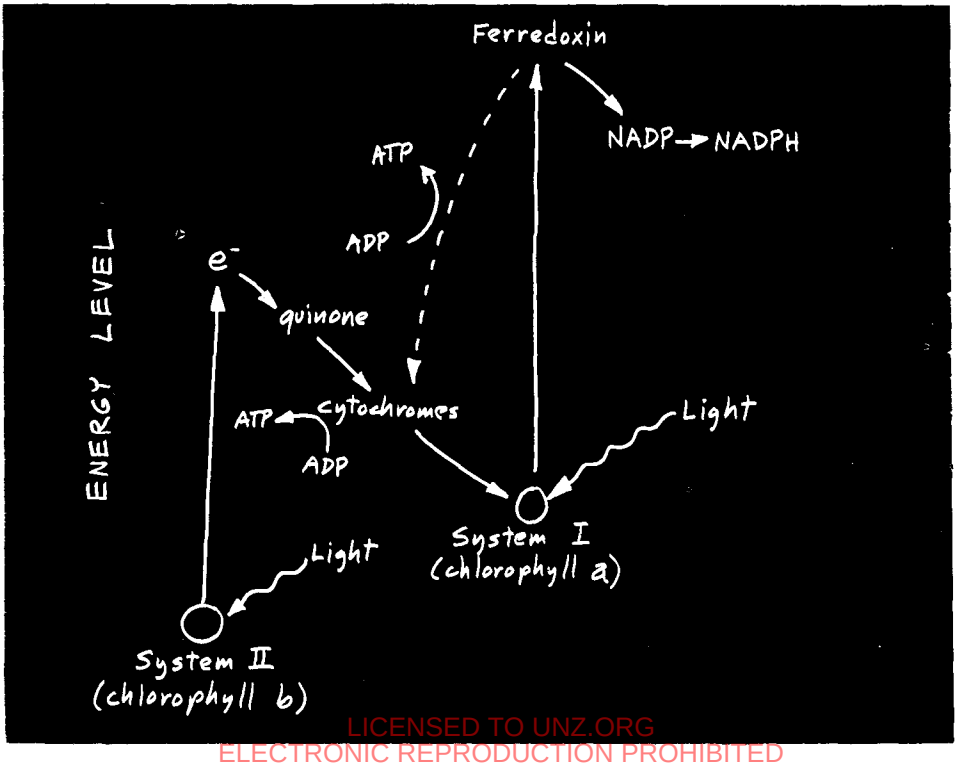
binations.) It is really quite astonishing that cyanide, now the bane of life, may have participated in the formation of one of the fundamental molecules of living organisms.

The light reaction of chloroplasts.

We can now proceed to the problem of ATP synthesis in chloroplasts. Both ATP and NADPH are produced in the poorly understood light-dependent reactions of chloroplasts. Again, we can divide these reactions into two sub-reactions. In the first, electrons are raised in energy level when light strikes chlorophyll within the grana, and in the second, that energy is trapped by linking it to ATP (photophosphorylation) or NADPH (photoreduction) synthesis. Figure 5 shows an energy diagram for the major events which are presumably involved. Keep in mind that this is highly abstracted from the real situation, and that if it is not too clear what is going on, it is also rather muddled for the scientists working in the area.

There are two photosystems in chloroplasts, which use two different wavelengths of light. These correspond roughly to aggregates of chlorophyll a and b, the two molecular species of chlorophyll. A quantum of light strikes photosystem II and is absorbed by the light-

FIGURE 5



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trapping pigments. As a result of the absorption one chlorophyll out of every 300 or so loses an electron. Light energy is initially trapped by this event. The electron jumps energetically "uphill" and reduces a pigment called plastoquinone. From here it begins to fall energetically downhill through a series of chemical oxidation-reduction reactions and ultimately reaches photosystem II, an aggregate of chlorophyll molecules. Light has also been striking photosystem I, and the incoming electron, along with others, is again pumped uphill and reduces a large molecule called ferredoxin. Finally it is given to NADP, which is reduced to NADPH. By the way, an important point to note here is that in many biological reduction reactions an electron *and* proton are added to the reduced molecule. The reduced form is often written with an H— as in NADPH—which stands for hydrogen, since in essence a hydrogen—proton plus electron—has been added to the molecule.

Photoreduction as described above is the source of NADPH later used to reduce CO_2. But what about the ATP? Here we have hit upon the embarrassing mystery. The mechanism of ATP synthesis is highly debatable, and at present an enormous controversy is simmering in the world of bioenergetics. The rest of this essay will be devoted to a discussion of a recent and controversial hypothesis of phosphorylation. To best understand what is involved, we should first discuss a simpler classical hypothesis of phosphorylation, which is now called the chemical hypothesis.

Photophosphorylation: the chemical hypothesis.

One feature is common to both hypotheses: ATP synthesis is somehow coupled to the downhill flow of electrons, as shown in Figure 5. In photosystems I and II electrons fall back to their ground state through an electron transport chain. This is a series of intermediate compounds which can alternately be reduced and oxidized as electrons are passed from one compound to the next. The classical, or chemical hypothesis of phosphorylation suggests that upon oxidation or reduction, one or more of these intermediates can react with unknown compounds so as to lose a water molecule—dehydration step—which produces a high energy chemical bond. The bond is then passed on to ADP and P_i to form ATP. The energy conserving step is thus the loss of a water molecule during electron flow.

The chemical hypothesis has been worked out in greatest detail for mitochondrial phosphorylation, and one proposed reaction scheme is shown in Figure 6. SH stands for reduced substrate, such as succinate ($HOOC\text{-}CH_2\text{-}CH_2\text{-}COOH$) which is derived from the breakdown of glucose prior to entering the mitochon-

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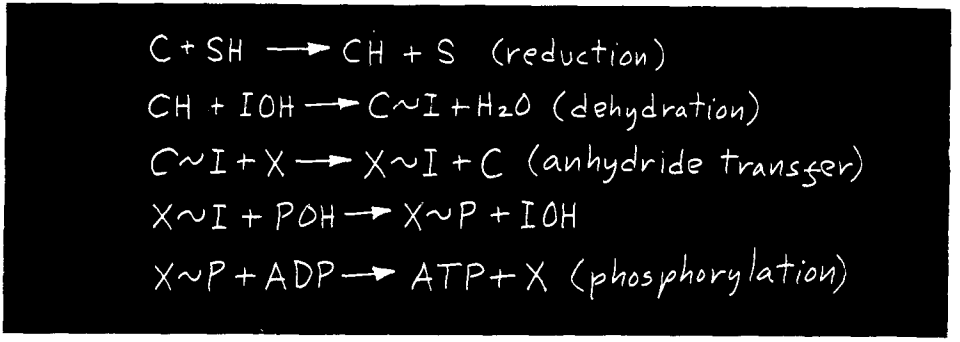

FIGURE 6

drion. SH loses electrons and protons to the electron transport chain and is thus the source of electrons for the reaction C→CH, where C is a member of the chain. In chloroplasts, the initial reduction step (C→CH) would be carried out by light energy, rather than getting electrons from reduced substrate. The rest of the phosphorylating reaction series would presumably be the same,

Don't be confused by the use of X, I et cetera. X and I in the scheme are well-named: no one knows what they represent. The ~ sign—read squiggle—represents a high energy bond. The most important point to note about this hypothesis is that all reactions proceed *chemically*. An electron transfer step, a dehydration step and a group transfer step are the only reactions involved, and these are all well understood in simpler systems. There is one problem, however. After twenty years of ardent search, nobody has managed to provide convincing evidence that any of the hypothetical intermediates exist. There are other problems: phosphorylating systems are always membranous. For example, the grana shown in Figure 1 are composed of hollow membranous disks piled one on another. No obvious reason for this structural requirement is provided by the chemical hypothesis. Furthermore, all phosphorylating systems can transport ions such as potassium, calcium and protons across their membranes. Again, there is no logical reason for this in the chemical hypothesis.

The chemiosmotic hypothesis.

To unify the above points, and to avoid the necessity for postulating the existence of unknown intermediates such as X~I and X~P, a British biochemist named Peter Mitchell has proposed an alternative hypothesis. This is now called the chemiosmotic hypothesis, or

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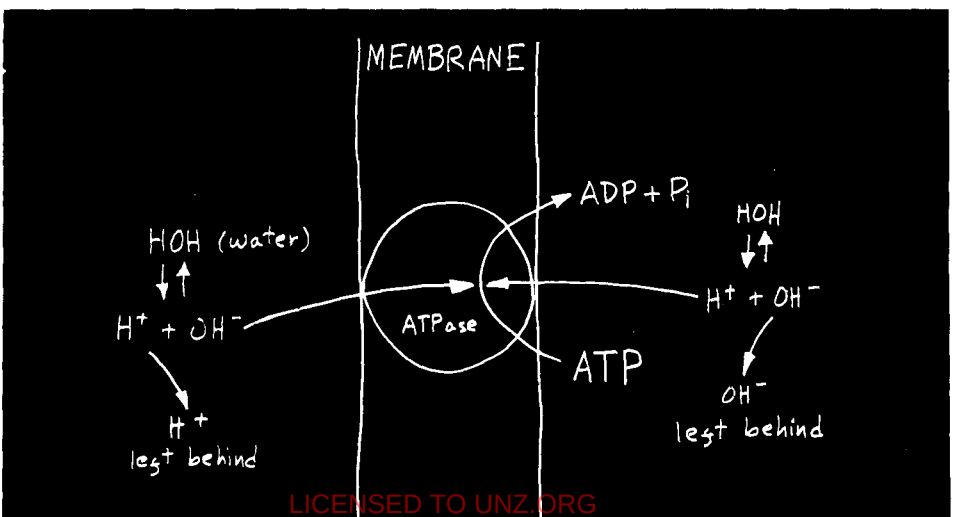
Mitchell hypothesis, and has redirected much of the thinking and experimentation in this area. It should be stressed that this concept is by no means generally accepted and is, in fact, highly controversial. However, even its most ardent opponents will concede that it is a beautiful and elegant idea and has advanced the field simply because it has so many experimentally testable predictions.

There are three themes to the Mitchell hypothesis. The first is that a molecule of water is added during ATP hydrolysis to ADP and P_i. This, of course, is common knowledge, and the word "hydrolyze" means "to break with water." Obviously in the reverse reaction, or phosphorylation, it is necessary to extract a water molecule or its equivalent from ADP and P_i. (These reactions are shown in Figure 3.)

A second theme is the fact that adenosine triphosphatase—ATPase—enzymes are present in all phosphorylating systems. ATPases are large, protein molecules which catalyze the addition of water to ATP and cause rapid hydrolysis to ADP and P_i. Let's work with these two facts first.

Mitchell suggested the deceptively simple possibility that when ATP was hydrolyzed by a membrane-bound ATPase, water was added *anisotropically*. That is, H^+ was added from one side of the membrane and OH^- was added from the other, as shown in Figure 7. Other workers had assumed that water was added anisotropically, with no vectorial component. The anisotropic process would lead to a separation of charge across the membrane, since OH^- would be left behind on the side where H^+ was used, and vice versa. The separation of charge thus produced would in turn result in a voltage, or mem-

FIGURE 7



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brane potential, across the membrane.

Mitchell then pointed out that all chemical reactions are theoretically reversible, including the hydrolysis reaction of ATP. He proposed that if a phosphorylating system could somehow set up a membrane potential across a membrane containing an anisotropic ATPase, the ATPase reaction would be reversed. That is, H^+ would be drawn toward the negative side of the membrane, and OH^- to the positive side. In this manner, the equivalent of a water molecule (HOH) would be removed from ADP and P_i and ATP would be synthesized. This is simply the reverse reaction of the one shown in Figure 7.

Very interesting. So how could a membranous system set up a membrane potential? It should first be noted that there are certainly examples of such a process in nature. For instance, nerve cell membranes maintain a potential of about 100 mV, and Mitchell has calculated that 210 mV would supply sufficient energy to reverse ATP hydrolysis. The question is then: how do chloroplasts and mitochondria set up membrane potentials?

This is where the third theme comes in. Mitchell suggested that the electron transport chains in mitochondria and chloroplasts can produce membrane potentials by separating electrons from protons in a process called anisotropic electron transport. A highly simplified example of such a reaction is shown in Figure 8. In this reaction, light energy causes an electron to be given to a quinone—see Figure 5. The quinone, upon reduction, takes on a proton to become a quinol. The important thing to note is that the quinol must donate its electron vectorially across the membrane, rather than giving it off isotropically in no particular direction. The proton would be released as shown when the electron was accepted and charge would be separated across the membrane. A similar process may be envisaged for mitochondrial electron transport, except that the electrons and protons are taken from a reduced substrate, rather than having a photoelectric origin.

This explanation probably isn't very satisfying. Unfortunately, to explain it thoroughly would take many more pages. For more thorough reviews, several references are given at the end of this article. The major point to be made is that in one stroke Mitchell has accounted for all of the poorly understood aspects of phosphorylating systems:

1) Such systems must be membranous, since a membrane potential must be maintained for ATP synthesis to occur.

2) Ion transport is integral to Mitchell's theory. Protons are transported across membranes to produce a membrane potential, and under the proper conditions other ions

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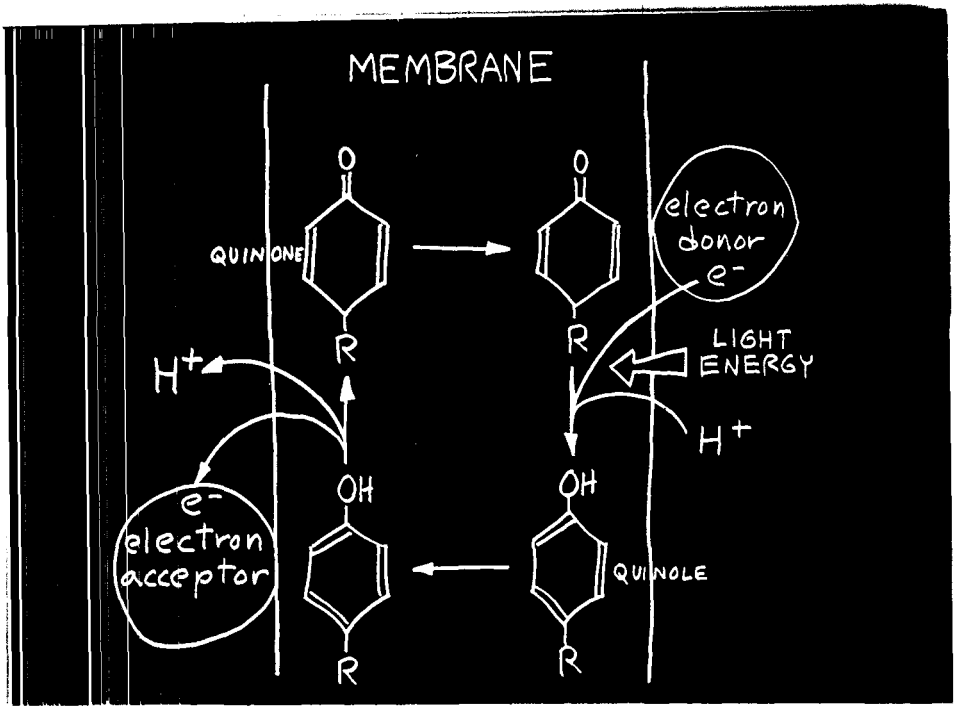

FIGURE 8

[illegible] response to the ini[illegible] movement.

ATPases and electron transpo[illegible] are neatly linked in a conceptu[illegible] whole. No high energy interme[illegible]ates are required for phosphorylation to take place.

Experimental tests of the Mitchell hypothesis.

There are a number of tests of the Mitchell hypothesis. Some of these have led to exciting new vistas in our understanding of life processes. According to the hypothesis, phosphorylating membranes must be capable of building up a hydrogen ion gradient, since protons must be transported across to drive ATP synthesis. Hind and Jagendorf, at John Hopkins, put this to a direct test in 1963 by illuminating a suspension of isolated chloroplasts and simultaneously measuring the pH—H^+ concentration—of the medium. A truly remarkable thing occurred: the chloroplasts pumped enough protons across their membranes to lower their internal pH to about 2.0, a value almost as acidic as stomach acid.

Uribe and Jagendorf then took the next step. If ATP synthesis is driven by proton transport, as suggested by Mitchell, it should be possible to produce ATP by forming an artificial proton gradient across chloroplast membranes in

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the presence of ADP and Pi. In an elegant experiment described in the "Proceedings of the National Academy of Sciences," Uribe and Jagendorf reported that when acidified chloroplasts were injected into alkaline solutions, large amounts of ATP were synthesized in the dark. This result could only have been predicted by the Mitchell hypothesis.

Conclusions.

At first glance, some of these ideas seem bizarre, and a number of scientists have been put off by this quality. A chemist prefers to think of reactions proceeding in an orderly manner with well-defined intermediates. The idea of chemical reactions being driven by proton gradients across membranes containing reversible, anisotropic ATPases . . . well. But at a recent symposium on phosphorylating membranes Mitchell has stressed that his ideas are a biological application of well-known principles which govern fuel cells and solar cells. In a fuel cell, for instance, a fuel—reduced carbon compound—is oxidized at a semipermeable barrier which lets electrons cross only in one direction, analogous to the anisotropic membranes discussed earlier. This builds up an electrical potential whose energy may be used to drive electrical equipment. In solar cells, photoelectrically released electrons can only travel in one direction and thus have a vectorial component. Again, this produces a voltage and usable current.

So it seems that our present technology may be evolving toward methods of trapping and transducing energy which nature perfected and miniaturized over a period of several billion years. The future may hold a method of trapping solar energy as effectively as do chloroplasts, perhaps involving a combination solar cell-fuel cell—how about calling them SF cells—which reverses the reactions taking place in fuel cells. It doesn't boggle me too much to imagine an SF cell which, when placed in sunlight, can collect carbon dioxide and water and turn out a reduced gas such as formaldehyde or methane. Either could be burned or used in a second fuel cell, of course. Oxygen would be a by-product of the reaction in SF cells. Obviously such an item would be useful on a really long trip in space, say to Mars or thereabouts. You may be assured I am working on the possibility.

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test ultimate

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A really good officer is not necessarily an obedient soldier. And the Patrol had a fine way of separating the buck-passers from the test-passers!

CHRISTOPHER ANVIL

Illustrated by Vincent di Fate

Vaughan Roberts, his muscles tired and sore, stood in the clearing with the other recruits, waiting for the last test to begin. Roberts leaned into the wind that had sprung up, and that made the branches of the trees lift and sway, hiding and then uncovering the dazzling sun. The shifting shadow and glare made it hard to see the guide who had led them almost to the end of the training course, and who now spoke to them from a low platform of logs at the edge of the clearing.

" . . . Just one final test, gentlemen," the guide was saying, "and then your training will be over, and you will be full members of the Interstellar Patrol.

"There isn't much to this final exercise, but you must carry it out successfully to pass the course, so you might be interested in a few brief comments.

"To survive, and successfully do his duty, a member of the Interstellar Patrol must make the right use of courage. This quality is so important the final test will emphasize the proper use of courage.

"Now, this is not a complicated test. But it has its points, gentlemen, as I think you will agree after it is over.

"The problem is simply to climb a rock face twenty-five feet in height, onto the ledge at the top. The climb is not difficult, but to get to this rock face, you must first cross a wide, shallow pool. It is a pretty pool, at first glance. But it is stocked with carnivorous fish.

"Remember, gentlemen, this is a test in the proper use of courage. You may not enjoy it, but you must do the best you can to succeed, whatever that may involve.

"To avoid too high a loss rate, the test will be given by simulator. You will experience a highly realistic illusion, that, to your senses, will be the same as if it *were* real.

"As an aid in learning, a special guide will be assigned to each one of you in this final test."

Roberts abruptly found himself standing in the quiet shade of tall trees, on a stony slope that slanted gradually down to a wide, shallow

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pool of sparkling, splashing water. Directly across the pool was a narrow border of marsh, rising to a steep forested hill farther back. To Roberts's left, across the length of the pool, was a gray rock face, down which a rivulet of water trickled onto a wide rock shelf, whence it flowed quietly into the pool.

For an instant, the scene seemed pleasant. Then Roberts realized that the sparkle and splash were caused by sleek steel-gray forms that burst up out of the water to snap, and then splatter and splash the surface. The ceaseless flash and snap, and the splatter and splash as the carnivorous fish fell back, now made the pool look to him like a kind of seething hellish cauldron.

Just as the full impact of the scene hit Roberts, a powerfully built figure in the shadows near the edge of the pool turned toward him. Wearing a tight, black one-piece garment, with three rows of ribbons at the left chest, and wide belt bearing knife and fusion gun, this figure was plainly the special guide. Roberts, relieved, waited for instructions.

The guide raised one muscular arm, and swept it out across the pool toward the rock face.

"Don't hesitate. This is a courage test. In you go, and head straight for that rock face!"

Roberts, relieved to have some clear-cut direction, started forward.

Ahead of him, the water seethed.

Roberts fixed his mind on the rock face across the pool, made a rapid estimate of the distance, and then saw with a start that the water was so roiled up that he couldn't see the bottom.

The voice of the first guide, back at the clearing, came to him: "The problem is simply to climb a rock face twenty-five feet in height, onto the ledge at its top."

There across the pool was the rock face and the ledge. But considering that these fish were carnivorous, how could he get through them, across a possibly uneven bottom that he couldn't see, without being eaten up on the way?

Nearby, the special guide called sharply, "Don't hesitate! *Keep moving*!"

Roberts hesitated, then with an effort kept going.

In front of him, the steel-gray forms leaped out, their sharp jaws flashing with a knifelike glint.

The guide, his voice approving, shouted, "Good lad! Now, *straight for that cliff*!"

Roberts's mind seemed split in halves. Thoughts flashed through his consciousness in a chaotic rush:

"Don't hesitate! Keep moving!"

"There isn't much to this final exercise, but you must carry it out successfully to pass the course . . ."

"Don't hesitate. This is a courage test. In you go, and head straight for that rock face!"

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"The problem is simply to climb a rock face . . ."

". . . Now, go straight for the cliff!"

"Remember, gentlemen, this is a test in the proper use of courage."

"Don't hesitate. This is a courage test . . ."

". . . A test in the proper use of courage."

Across the pool, the rock face loomed like a mirage over the water. Ten feet out from shore, a big steel-gray muscular form leaped high and fell back, and the splash briefly uncovered a glistening human rib cage.

Roberts stopped in his tracks.

The special guide whirled, put his hand on Roberts's shoulder, and said sharply, "Go straight in! Even if you don't make it, I'll vouch for your courage. *That's all you need to pass the courage test!* Now, *move!*"

He gave Roberts a push to start him into the pool.

Abruptly the two divided halves of Roberts's mind came back together again. He ducked free of the pushing hand, pivoted, and smashed his fist into the guide's muscular midsection.

The guide doubled over, his arms flew out, and he slammed back into some kind of invisible barrier, that recoiled and threw him back toward Roberts. The guide recovered himself, and his hand flashed toward his fusion gun.

Roberts hit him again in the midsection.

The guide went down, and at once came up on one knee, still groping for the fusion gun.

Roberts jerked him to his feet, and knocked him down for the third time.

The guide landed full length on the ground, and Roberts bent, to swiftly take the belt, with its knife and gun. He had hardly straightened, when the guide again struggled to get up, and Roberts cracked him over the head with the gun.

The guide sat back down with a grunt, then started up again.

Roberts stepped back, frowning. He held the gun in one hand, and the belt, with holster and sheathed knife, dangled from the other hand. So far, he hadn't been able to put the special guide down long enough to fasten the belt.

The words of their original guide, back in the clearing, came to him:

"Now, this is not a complicated test. But it has its points, gentlemen, as I think you will agree after it is over."

Roberts glanced out at the seething pool, and back at the grim-faced special guide, just coming to his feet.

Despite the gun, the guide suddenly rushed him. Roberts landed a terrific kick at the base of the chest.

The guide went down, and this time it looked as if he might stay there a while.

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Roberts clasped the belt around his waist, looked at the fish springing from the water, glanced back at the motionless guide, then looked around, spotted a length of fallen branch lying on the ground with most of the twigs rotted off. He picked up the branch and swung it over the pool, the far end dipping into the water.

Instantly, the water exploded in gray forms.

Snap! SNAP! Snap!

The branch lightened in his hand as two-and-a-half feet at the far end disappeared.

Roberts glanced around at the guide, already starting to shake his head dazedly. With his thumb, Roberts felt the end of the stick. It was cut off smooth, as if by a sharp curved blade.

The guide sat up, his eyes focused on Roberts. He came to his feet in one fluid motion.

Roberts aimed the gun at the guide's head.

The guide's eyes glinted, and he started forward. His voice had a sharp ring of authority.

"Drop the gun. I'm coming to take it, Mister. *Drop* it!"

Roberts depressed the fusion gun's trigger, and the searing pencil of energy sprang out, missing the guide's head by several inches.

Roberts said flatly, "*Halt*!"

The guide halted, face stern and eyes intent.

"Now," said Roberts, "just back up to where you were."

The guide didn't budge. "You won't get away with this!"

Roberts watched him alertly.

"I won't get away with *what*?"

"Cowardice! You don't show the guts to do as you're told! Now, *drop that gun*!"

Roberts kept the gun aimed at the guide.

"I was told to climb that rock face. I can't climb it if I don't last long enough to get near it. To obey your instructions would guarantee that I wouldn't do what I am supposed to do."

"I told you, Mister, that if you showed courage, I'd vouch for you!"

"That's nice. But that won't get me up that rock face."

The guide's voice came out in a deadly menacing tone.

"Do you question my word?"

"Yes," said Roberts. "As a matter of fact, I question everything about you. I have a suspicion that somewhere there's a complicated little network that projects a mass of muscle, an empty head, and a loud voice, with built-in responses, and that's all there is to you. There's something about you that fits the Interstellar Patrol like oars on a spaceship. Incidentally, I notice you haven't stepped back. *Back up*!"

Glowering, the muscular figure backed up several feet.

"All right," said Roberts, "turn around."

"Go to hell."

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Roberts aimed the fusion gun at the guide's midsection. "Friend, there's a kind of courage that makes sense, and there's another kind that's stupid, even in an illusion. The more I see of you, the more convinced I am that the Patrol would never have let *you* in. It follows that what you really are is a special kind of highly advanced electronic booby trap. You almost got me into that pool, but not quite. That push was too much. If this were strictly a test of raw courage, I'd have had to go in under my *own* power."

"I was helping you."

"That's the point. That help would spoil the test."

The guide spoke in a reasonable, persuasive voice. "I could see you weren't going to make it without help."

"In that case, I'd have been allowed to fail. What's the point of a test if you pass those who should fail?"

The guide now looked sympathetic.

"Lad, I knew a little help at the right time would get you over the hurdle. I never thought you'd show a yellow streak this wide. But I'm still willing to overlook all of this, if—"

Roberts shook his head critically. "Among other things, now you're ignoring the fact that I was given a definite goal, with no set time-limit. Why, should I have to *immediately* jump in with the carnivorous fish? I was told to *cross that pool and climb up that rock face onto the ledge*. That may involve the right *use* of courage, but instant suicide won't accomplish the job."

"Well, now, that about the rock face was only how it was *expressed*. The thing is to *show courage*. That's the test!"

"When you're ordered to attack, the thing to do is to just rush in quick where the defenses are thickest, eh?"

The guide looked reasonable again.

"What do you gain by delay? Sooner or later, you'll *have* to go in. There's a field of force on all sides of us, overhead, and under the ground surface, that leaves just this space between this edge of the pool and the trees. The only opening in the field is toward the pool. *There is no other way out.* What do you gain by putting it off? I'll overlook what you've done if—"

"Turn around," said Roberts.

The guide looked blank, and ignored the demand.

Roberts shifted the gun slightly. "*Turn around.*"

The muscular figure turned around.

Roberts said, "Lie flat on your face, hands at your sides. Now, keep your arms straight, but work your hands and arms under your body, so your right thigh pins your right hand, and your left thigh

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pins your left hand. All right, work the whole length of your arms under. Stay that way."

The guide lay flat on his face in the stony dirt.

Roberts walked over.

"Bend your legs slowly at the knee. Raise your feet."

Roberts piled stones on the guide's shoulders, and on the flat soles and heels of the guide's boots.

"Now, don't move, or the stones will fall off, and the clatter will warn me."

Roberts walked back near the water's edge, and looked out over the pool. He had one obstacle temporarily out of the way, but he was still a long distance from that ledge. He carefully felt along the invisible barrier, and, so far as he could judge, it was exactly as described. It felt somewhat like the edge of a kind of large transparent balloon, yielding as he pressed against it, but growing progressively harder to force back as he displaced it. When he stopped pushing, it forced him back.

As he moved around, he glanced repeatedly at the guide, who was cooperating, so far.

There seemed to be no way around the barrier, and very possibly no way to shorten the distance across that stretch of seething water. What the bottom was like was anyone's guess, but it could be uneven blocks of rock, covered with slime, and littered with the skeletons of past victims. From what Roberts had seen, ten seconds in that water would guarantee that he wouldn't climb that rock face.

A dull glint from the direction of the rock face briefly caught his attention, but, when he looked, he saw nothing different, and merely retained the impression of a falling rock. He glanced around.

There *had* to be some way to either get over the pool without going in it, or to deceive or eliminate the fish.

Roberts glanced at his prisoner, then looked at the forest cut off from him by the unseen barrier. Experimentally, he fired his fusion gun. Swinging the beam to be sure he was seeing what he thought he was seeing, he found that the barrier stopped the beam each time. It didn't reflect it. It seemed to absorb it. That meant that he couldn't hope to fell across the pool any of the tall trees beyond the barrier. And where the fusion beam *could* reach, there were no trees close enough to the pool to do any good.

Roberts watched the fish leaping from the water, raised the gun, waited, then aimed at a gleaming gray form, and squeezed the trigger.

A large sharp-jawed fish dropped back, eyes bulging, hit awkwardly on its side, and flopped around on the surface.

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All across the pool, the leaping and splashing stopped. The surface of the water roiled in a hundred swift brief currents. The injured fish was jerked, wrenched, and ripped to bits, sharp snouts and sleek flanks showing for just an instant around it.

Roberts aimed carefully, and fired a second time.

A second fish twisted up nearly out of the water, and fell back with a flat splash.

The others at once tore it to shreds.

Roberts fired a third time, at an exposed flank.

A third fish flopped on the surface.

The water around the injured fish was alive with snapping, tearing, steel-gray forms.

Back of Roberts, there was the clatter of a fallen rock.

In rapid succession, Roberts fired at several more fish, then glanced back.

The guide had dumped the stones from one foot, and was carefully lowering the other.

Again, out of the corner of his eye, Roberts sensed motion at the rock face. But there was no time to look in that direction.

He fired carefully, just over the guide's head.

The guide froze.

Roberts turned back, and glanced briefly at the rock face. All that moved there was falling water.

He looked back at the pool, and fired at another fish, and then another.

He kept firing methodically, until suddenly there were no more targets.

A few bits and fragments floated on the surface, but nothing attacked them. The flying insects ranged over the pool unmolested.

Now, supposedly the remaining fish were glutted. If so, it *should* be safe to go across the pool.

Roberts glanced at the rock face to his left, estimated the distance, and blinked.

Down this face of rock, along with the trickle of water, flopped a sleek steel-gray form, bounding and turning, to hit the rock shelf below, where the water flowed out toward the pool, with a loud *splat*.

Roberts abruptly realized what this would do to his plans, and raised the gun.

Behind him, there was a crash of pebbles, and a sudden scramble.

The guide was on his feet, hurtling straight for him.

Roberts sprang aside.

The guide changed direction and slid, then Roberts was back out of the way, and put the thin, dazzling beam of the fusion gun in front of the guide's eyes.

The guide stopped.

Now, Roberts thought, he had survived that.

But, at the same time, that one fish that had come down the rock

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face had flopped into the pool. And *that* fish wasn't glutted.

Roberts glanced out at the water, and the bits and fragments were no longer floating on the surface. But that little appetizer wouldn't be enough. The fish would still be hungry.

There was a splash, and out of the corner of his eye, Roberts could see the sleek gray form fall back and vanish, after snapping up one of the flying insects.

The guide said, "Drop the gun," and began to slowly walk toward Roberts. "*Drop* it!"

Roberts put the beam of the fusion gun over the guide's left shoulder. Then he put it past the guide's head over the right shoulder.

The guide grinned, and his eyes glowed.

He kept coming.

From the direction of the rock face something flashed briefly, falling down the stream that flowed over the rock to hit with a *splat*.

The guide charged.

Roberts sprang aside, kicked him under the chin, whirled like a ballet dancer and hammered him across the back of the neck as he passed.

The guide grabbed unsuccessfully at Roberts's leg, then went down on his hands and knees.

Roberts said coldly, "It's a mistake to try unarmed combat on a man armed with a knife and a gun." But he was noting that blows that would have killed an ordinary person were about as effective with this opponent as taps with a length of rolled-up paper.

The guide stumbled to his feet, turned and faced Roberts. "You won't fire the gun or use the knife. Not to kill me. Because you're yellow." He straightened, and his face showed pitying sympathy. "Sorry, lad, but you're yellow."

The guide began walking calmly toward Roberts, his face sure and confident. "Drop the gun. You won't use it. *Drop* it."

Roberts aimed at the guide's head.

The guide kept coming, his face reflecting quiet confidence.

Robert squeezed the trigger.

The fusion beam hit the guide's left eye. There was a dazzling white glow, the flesh peeled back like paper in a fire, and there was a splintering *crack*! Bits and fragments of glass or plastic, glowing redly, flew out in a shower.

"*Halt*!" said Roberts.

The guide halted.

Where the flesh had peeled back to expose the left eye socket, a silvery glitter showed instead of bone.

Roberts reminded himself, all this was taking place in a simulator. But the problem remained.

Roberts studied the motionless roboid "special guide" and said, "I didn't realize the Patrol was so hard-pressed for man power that it was recruiting humanoid robots."

"No, sir."

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"How come that now I'm 'sir'?"

"At this stage, sir, I am programmed to so address you."

"You will obey my orders, now?"

"Yes, sir."

"At this stage?"

"Yes, sir."

"So that, if I order you to go over to the water and kneel down you will do it?"

"Yes, sir."

"And if I command you to carry me piggyback across that pool, you will carry me piggyback across the pool."

"I will obey you in this phase, and, at your order, will do *anything* I am capable of doing."

That left unanswered the question whether the robot was capable of carrying him across. It also raised another point. Roberts cleared his throat.

"When does 'this phase' end?"

"When an internal mechanism gives the appropriate command-signal, sir."

"When will that happen?"

"I cannot predict, sir. It depends on circumstances."

Roberts nodded. That fit in. The "command signal" would be given at that unpredictable moment when Roberts stuck his neck out far enough for the "guide" to heave him into the pool.

"I see," said Roberts. "Can *you* cross that pool without being attacked?"

"The fish are turned back by a chemical repellent with which my garment has been impregnated. sir. They would otherwise bite me as they would bite you; but they would not ingest my substance, as it is not nourishing to them."

"All right. Go over near the edge of the water, and kneel down."

The robot willingly and obediently went near the edge of the water and knelt down.

Now, thought Roberts, if he climbed on its back, it would take him partway across and then toss him to the fish.

The function of this "special guide" seemed to be give disastrous advice and murderous assistance. It followed that there was only one thing to do.

Roberts stepped back, aimed deliberately at the base of the robot's neck, and depressed the trigger.

The fusion beam sprang out.

There was a flare of flame, flying sparks, the "head" tilted and separated from the robot's body, and the body rose and wheeled toward Roberts.

Roberts shifted his aim to the lower chest, and the robot fell forward on the sand.

From the rock face to one side a dull flash briefly caught Roberts's attention.

Down the rock face, another steel-gray wetly gleaming length of muscle and hunger tumbled, to land with a *splat*, and flop into the pool.

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Roberts wiped the sweat out of his eyes, warily circled the human-like form, and crouched near its feet. Carefully, he undid the boots, and, holding the gun, stood thoughtfully considering the one-piece garment. He carefully pulled off the boots, but he had a disinclination to get in reach of the arms, however motionless the robot might seem.

Was the thing out of action, or wasn't it?

He stepped back, found what was left of the long stick he'd held over the water, lightly pressed the end to the edge of the one-piece garment, partway up the back. He moved the stick as if he were tugging at the cloth with his fingers.

Pebbles flew and dust whirled as the headless robot sprang at the stick.

Roberts fired at the robot's lower chest, and again it dropped to the ground.

Now, this time was it finally out of action, or wasn't it?

And what if, in trying to make sure he had hit the control mechanism, he hit the energy-source instead?

Roberts blew out his breath and stubbornly considered the situation.

The obvious thing to do was to get that repellent-impregnated garment.

Roberts raised the gun, and methodically burned the thick arms off the trunk of the mechanism, cut a line across the garment with the fusion beam, warily took hold, and pulled the garment free. A hard kick threw him back and could have knocked him into the pool if he hadn't expected it. But now he had the cut, but still usable, garment. And he could see that he was going to need it.

Down the rock face across the pool, another steel-gray form spun and fell, hit the shelf below with a *splat*, and flopped into the pool.

With an influx like that, there must be some way out for the fish already in the pool. But from where he was, Roberts couldn't see it. He shook his head, put the garment on over his fatigues, put his shoes back on, started for the pool, and then paused, looking at the robot.

The headless, armless torso had rolled toward the place where he would have landed if that last kick had fully connected, and now it was feeling carefully with its feet along the water's edge. Finding nothing, it lay still.

Roberts stood frowning.

Considering the source, how had he come to take *that* piece of information for granted?

He took his shoes off, and pulled off the robot's repellent-impregnated garment. He put his shoes back on, searched along the edge of the invisible barrier, found a second long stick, tied one leg of the garment to the stick, and let the other end of the garment hang

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free. He walked down near the water's edge, swung the stick out over the water, and dipped about eight inches of the garment into the water.

The stick jerked in his hands. The garment was cut off in a ragged edge half-a-foot above the water, and the steel-gray forms shot up in a boiling froth to snap bits off the part that dangled higher yet.

Roberts straightened.

This was the "repellent-impregnated" garment he had almost relied on.

Roberts glanced around at the robot, saw it was too far away to bother him, drew the fusion gun, lowered the remainder of the garment's dangling leg barely into the water, and shot the first fish to leap out after it.

Other fish attacked that one, and, using his tried and proved method, Roberts reduced their numbers by enough to satisfy the appetite of the remainder.

And once again the pond became placid.

The robot was now exploring the far edge of the barrier's opening on the pool.

Roberts, thinking over the situation, decided that things were about as favorable as he could hope to get them. Most of the fish in the pond should now be digesting the last meal, and any that might still be hungry ought to be attracted first to the remaining cloth on the end of the stick, rather than to him.

Dipping the cloth in the water, with the stick held in his left hand, Roberts eased carefully into the pool. The fusion gun, he held in his right hand, ready to use in case the cloth were attacked. But when he tried to move forward, his feet at once came up against some obstruction. He tried in a different place, with the same result.

The trip across now turned into a nightmare all on its own. Through the water, still murky, but no longer so badly stirred up, loomed skeletal rib cages and piles of bones. Here and there, a fish hung sluggishly, fins moving spasmodically. Roberts worked his way across, looking up frequently at the rock face, down which from time to time fell a steel-gray form that he had to kill before it got in the pool, because, if he didn't finish it, it might very well finish him.

By the time Roberts was halfway across, the worst of the horror looming up at him through the water had begun to ease off. The bottom was becoming clearer, apparently because most of the victims had never made it this far.

From there on, suddenly it became almost easy, and the bottom was so flat and unobstructed that just a little carelessness on Roberts's part would have dropped him

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down a narrow vertical cleft not eight feet from the edge of the rock shelf. He got across that with a sense of relief, reached the shelf, and just then something tugged at his shoe.

The cloth on the stick jerked, there was a splash, a sense of something brushing his leg, and when he looked down, the water was stained with red.

He threw the remainder of the "repellent-impregnated" garment into the pool, and pulled himself out on the rock shelf. He moved over near the face of the rock, took off his shirt, and bound it tightly around his badly bitten lower leg.

Now he discovered that the shoe of the same leg had been cut open, and he was bleeding from inside the shoe.

He took the shoe off, clenched his jaw at the sight, tore off strips of his ragged trouser legs, bound his foot, put the cut shoe back on, and laced it tight.

The bandages were turning red, but there was nothing he could do about that. He looked up at the rock face, which was apparently a form of shale, with many little ledges, some of them dry, and some of them, where the water flowed down, wet and mossy. The face wasn't vertical, but if he should slip, there was nothing there to give his bare hands a real hold until he hit the rock shelf at the bottom.

Carefully, he started to climb, clenching his jaw against the pain from his leg. About fifteen feet up, there came a flop-*thump* from above, and one of the steel-gray fish bounced past, snapping at him on the way by.

Roberts began to climb again. When he had almost reached the ledge, he paused, studying the green moss at its rim just above. The moss had little stalks on it, and each stalk had a set of miniature spikes at its end.

What would happen if he touched that? Was it, perhaps, poisonous?

He looked around, then, carefully worked to the side, and now he was on slippery wet rock. There was still moss up above, and he kept moving to the side.

Overhead, an occasional insect flashed out over the edge of the ledge, and then darted back again.

Another carnivorous fish flopped over the edge, and snapped its jaws shut not three inches from Roberts's left shoulder. He kept moving steadily to the side.

Finally, there was no moss up above, and no flying insects darting into view and back again.

Cautiously, he worked his way up onto the ledge.

To the side, where he would have come up if he had climbed straight up, was the edge of a shallow pool into which water flowed from a further, more gentle, incline of rock. Over this pool, fly-

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ing insects darted irregularly back and forth, to vanish suddenly as the fish shot up and snapped their jaws.

Roberts straightened and drew a deep breath.

Provided he had understood the rules in the first place, he had finally made it.

Abruptly the scene vanished.

The familiar guide—who had been with them throughout the course—looked at him with a smile.

"Well, Roberts, *you* made it."

"Thank you, sir. It's over?"

"It's over. And you are now a full member of the Interstellar Patrol. There will be a little ceremony later on, when the others join us."

" 'The others'?"

"Your fellow basic trainees. I regret to say, Roberts, that even among the best material for the Patrol, there *are* those who believe the sanction of authority is everything. Hence when they are told they will pass the last test if they merely plunge straight in, like so many sheep—Why, they *do* it! Even though it involves the sensations of being eaten alive by carnivorous fish."

"Don't they pass the test?"

"Oh, they barely pass the *test*. But the Board of Examiners immediately decides that their action brings into question prior indications of basic suitability for the Patrol. You see, we don't encourage *unthinking* reliance on authority, or on the appearance of authority. Some of the great defeats and disasters of history have followed from exactly that cause. We have trouble enough without that. So, we pick this last test to give a little reminder that our men should *have the courage to think*. Consider this, Roberts. A recruit in the Interstellar Patrol is given disastrous advice by someone with an air of authority—advice that obviously means the recruit will fail to do what he is supposed to do—and the recruit *does* it! We can't have that."

"What happens?"

"The Board of Examiners grudgingly recommends that the trainee be allowed the opportunity to *repeat the test*. Thus, after having unthinkingly taken his supposed superior's word for it, and having as a result experienced the sensations of being eaten alive by carnivorous fish, the trainee finds himself right back in the same spot all over again, with the same pool, the same fish, and the same electronic boob giving the same worthless advice. What do you *suppose* happens?"

Beside Roberts, his friend Hammell suddenly appeared, his face red, massaging his fists, and feeling tenderly of places low down on his legs.

"Well," said the guide, smiling, *"this* time you made it."

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Hammell growled incoherently.

There was another little blink of time, and there stood another friend and fellow trainee, Morrissey, his electric-blue eyes blazing in anger. And there beside him suddenly stood Bergen, his blond hair on end. One after another now they appeared, until the whole class was there, and then before them appeared a slight well-knit figure with a look of self-discipline and good humor.

"Gentlemen, in the Patrol, thought does not solely radiate from the top down, but takes place on all levels, including that lowest and hence *closest to the facts.* Any time you are tempted to pass the buck upward, or to blindly accept obviously disastrous orders without objecting to them, remember this incident. Possibly by doing so, you may avoid an experience worse than this one.

Very well, gentlemen, you have now passed the basic training course of the Interstellar Patrol, and you are full members in good standing of the Patrol, with all that this implies. You will now receive your weapons and full issue of uniforms, with appropriate insignia, in the order of your passing out of this course. As I call your names, step forward, salute, and receive your weapons and uniforms.

"Roberts, Vaughan N."

Respectfully, Roberts stepped forward and saluted. ■

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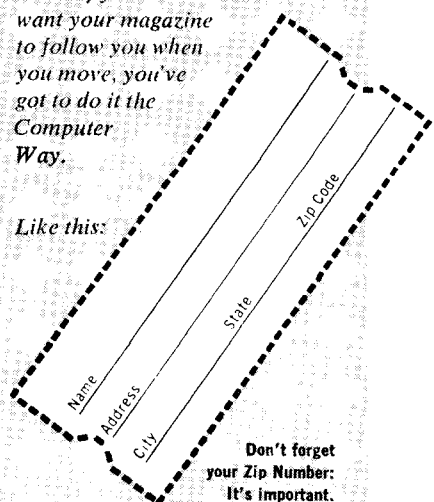

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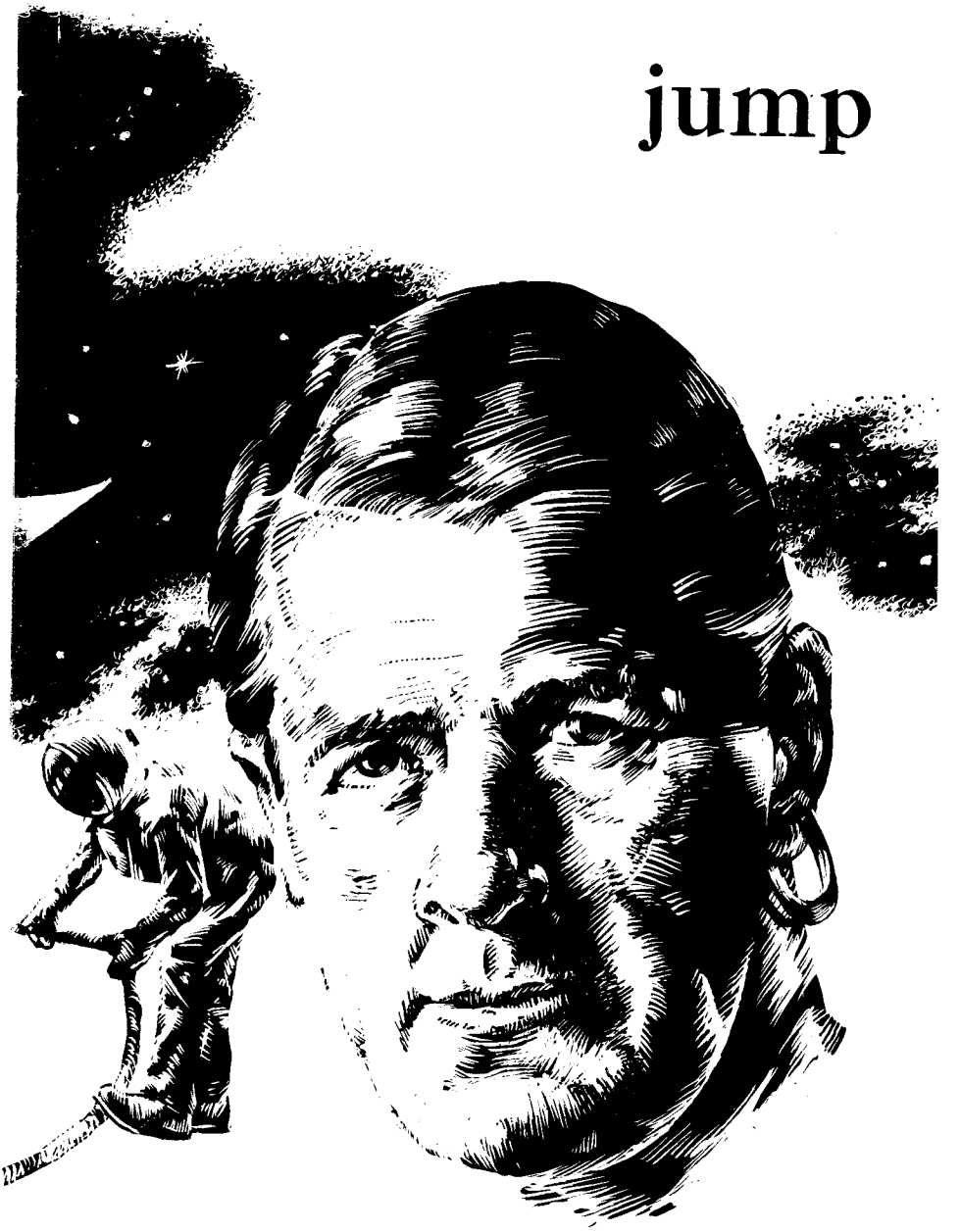

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Generally a man gets into a job
because that job and his personality fit.
But it gets to be hell
when job and physical body don't match!

WILLIAM EARLS
Illustrated by Vincent diFate

"Standby for Jump." The voice crackled over the *Stalwart's* intercom. Almost as an afterthought, the captain's voice added, "Lacey, report to Medical."

The tall man looked at the metal and fabric hole of the speaker. "Right," he said to no one in particular, turned and walked slowly to the ship's hospital.

"Jim," Dan Yamota, the ship's doctor said. "Eight minutes." He rose from behind a desk. "Do you want to be strapped?"

"No."

"A shot?"

"No. Point me to a cot," Lacey said. "I'll be all right."

"Liar. How about a drink anyway?"

"After Jump," Lacey growled. He walked toward a cot, lay down, his arms folded behind his head. He began to brace himself for Jump. He could almost feel the deceleration now, the slowing of the light ship's speed as the great craft began to move out of hyperspace into the real world of light and images. The doctor sat silently at the desk while Lacey braced himself for the shock to come.

Hyperspace affected all men differently; it was the thing that made a Spacer a Spacer. The men who operated the tourist and cargo shuttles between the planets of the Solar System knew nothing of it. But that period between light and light, that great, terrible nothingness of black, the space that stretched into infinity—that was what made a Spacer a Spacer. It got into a man's blood, his brain, his being, until there was only that and it became his love, his mistress, him.

But Jump, that was the rub, Dan thought. Hyperspace was fine, un-

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derstandable, but what's with Jump? Why can ninety-nine guys go through it with no effect and Lacey winds up here on the couch, shaking like a leaf, teeth chattering, sweat beading all over his face. Why Lacey? Why not anybody else? And there was no reason, and he knew there wasn't. It was just the way it was.

The doctor watched the second hand of the clock creep on and then the voice on the all-call said, "Five seconds. Four. Three. Two. One . . ."

The man on the cot went rigid and the arms went straight over his head, his fingers tightening, his exhalations strangled gasps above the moan of the ventilating fans. The face became a caricature and then the body went to a foetal position and the shakes came, the body fighting each terrible tremor as sweat broke from every pore. Each muffled scream was torn from the arm-locked chest, coughed into the dampening sheets of the cot. Yamota lit a cigarette, waited for his friend to gain control. Ten minutes later Lacey's tortured body relaxed and he lay quietly on the cot.

"Yuh, thanks," he whispered to Yamota's offer of a cigarette. Dan lit it for him, placed it between his lips. He puffed it silently for a moment, blowing the smoke past his sweat-soaked upper lip. "The hell with it," he said.

"With what?"

"I'm jumping. I can't take this any more, Dan. Look." He held his hand out and it was jumping. "As soon as we touch down, I'm getting out—of the corps, the ship, everything."

"Uh huh. And three days later when you're broke, tired of fighting grav, fed up to here with people, what then?"

"I'll get a job. Cargo handler, bio-tech, anything. Maybe even shuttle."

"Oh sure. Shuttle. The tourists'd eat you alive. One look at your earring and they'd never get off your neck."

"I'll risk it. There's a whole world out there, Dan. Do you know I've never been on a horse, or seen a waterfall? Maybe I'd like to do some of that before I kick off and get shot into the sun."

"There's more than a whole world out here. Horses, hell. You've been aboard a scout ship in the middle of an asteroid belt. You won't like it."

"I can live with it."

"Bet?"

"Fifty enough? How much time will you give me?"

"One Earth month—seven hundred twenty hours."

"You're on." The two men shook hands as Lacey stood up. The shakes had stopped and he walked calmly from the room. In four hours the ship would dock at Titan Float One and he would be needed.

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Eight hours later he arose from the pilot's seat and reached for a cigarette. Outside the ship, in the airlessness of space, the jockeys of the tie-down crew floated past the windows, attaching air and water hoses and power recharge lines. Within minutes, one of the Federation's greatest spacecraft would be nothing more than an embryo of the space platform, its great engines stilled, drawing its light, its power, and its life from the station. The cargo crews, the maintenance men, and the quarantine inspectors would have the run of the ship for the next one hundred hours.

"Stand by for Power Break," crackled over the all-call. All men aboard the ship stopped in midstep. "Five, four, three, two, one." The lights went out all over the ship as the captain's hand poised on the emergency cut-on switch. Three seconds later, they blinked once, came on again. The ship was now drawing power from the space station.

"Ready for libs, Lacey?" the captain asked him.

"Yes, sir. Definitely." He pitched his voice an octave lower. "May I speak with you alone, sir?"

"Sure." The captain indicated an office at the rear of the bridge, closed the door behind them as they entered. "What's up?"

Lacey took a deep breath. "I'm jumping, sir," he said quickly. "Now if I can."

"Yuh." The captain looked grave for a moment. "I expected this, you know. Just a feeling I had. Can you tell me why?"

"Jump. I can't take it any more."

"It was bad this time?"

"Worse than ever before, sir. Every time we make Jump, I'm a liability to the ship and to myself."

"I don't need you during Jump. You're a docking pilot and a scout-ship jockey. If you want to get technical, you're a liability the rest of the time, too. So am I, so's the doc. I need you, dammit."

"I can't take Jump."

"You live through it."

"I don't want to. Captain, I want out. Can I?"

"Of course. You know I can't hold you. Why don't you go down and pack up? I'll send down for your records. Be back here in an hour."

"Yes, sir." Lacey left the office.

A man can gather an awful lot of junk, he thought. Or an awful little, depending on how you looked at it. The locker that held his clothes and personal gear was crammed with items that meant so much to him—and to him alone. The section of meteorite that had buried itself in his helmet during an outside repair job. It should have killed him, though it only knocked him cold—and he had regained consciousness and finished the job. Cocktail napkins from every joint in the known universe, a

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picture of a girl. A photo of the admiral pinning a decoration on him. an anti-personnel weapon, a watch that never kept time. Four years of memories able to fit into a half meter box that was the limit a man could send home—wherever that was. A cubic half meter, when other men his own age had homes, families, furniture, and automobiles.

His clothes, his shaving gear, the watch, went into the hand bag he would carry with him. The rest—pictures, souvenirs, and even change—went into the box for Moon, where his parents and brothers could look at them and hold in their hands things from worlds they would never see. For even now, with the ships of the Federation spreading to all corners of the universe, there would be millions—as there had always been millions—who would never leave the place they were born.

The locker was clean and he looked around the small room he shared with Yamota—the two small bunks, the desk on which he had scrawled the too-infrequent letters home. the lockers. Even with all his belongs crammed into the box and hand bag, it looked like home. As it was. He left quickly to shut it out of his life.

He didn't bother with good-byes. It would be easier not to. He stopped only at the supply room to address the box to his parents, then walked to the captain's office.

"I'm not giving you a complete break, Jim," the captain told him. "As far as I'm concerned, you're on leave without pay. While you're on Titan anyway. You can stay at Spacer barracks for the duration of your stay here—it'll be a lot cheaper than living anywhere else. If you decide to come back—and I think you will—the orders will cover you for transportation any place the ship happens to be. I've got first call on you if you decide you just want a break."

"Thank you, sir."

"The doc told me he made a small bet with you."

"He gave me thirty days."

"I'll give you twenty. In case you're interested, we'll be working out of Grissom Station in Sector Three Zero. If you want us back, contact them. Here are your orders."

"I'll drop a note," Lacey said. He shook hands, lifted his hand bag, and walked from the office into the ship and from there into space station Titan Float One.

He caught the shuttle to Titan an hour later after a quick drink in the loading area. Like any tourist, he headed for the nearest viewport and watched the floating cross of the space station out of sight. Then his eyes shifted across the vastness of space and the blackness that was Jupiter next to it. An hour later, the shuttle's engines screamed as they made touchdown at Titan's spaceport.

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The great bulk of Jupiter was rimming the eastern sky as he walked from the shuttle to Customs and Quarantine, Even here, on the less-than-Earth grav of Titan, its bulk was unsettling, as though at any moment it would let go of its place in the heavens and come crashing down. But it never had, though a cynical Lacey was not sure that it might.

He was cleared quickly—as he expected to be. Only tourists got the full battery of Customs and Quarantine checks and that more because of their ignorance than anything else. But a Spacer knew where he'd been, what he might have run into, and would never leave ship as long as he had any reason to doubt his own health. As hypochondriacs, Lacey thought, we take second place to nobody.

Spacer barracks were possibly the finest and cheapest accommodations in the universe. The service took care of its own and there was no expense spared. For three credits a day—a man's leave allowance—he was fed as much as he wanted of the best foods available—although what was available varied greatly from place to place—and housed in clean, comfortable rooms. They were not the tiny bunk and locker rooms of ship, either, but sprawling, carpeted lounges with stereo receivers and luxurious couches.

A bar sprang open at the touch of a button and he poured himself a drink. Tourists, he knew, merely dialed what they wanted, but a Spacer, who lived with machines that could do almost anything a man could do—and do it faster and more economically—wanted to do something to remind himself that he could still do anything. He stripped to shorts, tossed his clothes into the laundry chute, and sprawled on the couch. Ten minutes later, and midway into a second drink, he was showering, luxuriating in water that he knew was only going to be used once. Ship water, refined, purified, and re-used a hundred, even a thousand, times, was still ship water and a poor substitute for the real thing. No matter how a man tried, he could not get used to the idea of showering with someone else's body wastes. Or drinking them.

Night was coming and with it Titan—or Spaceport Titan, anyway—would come alive. Outside of Phobos, which featured sexual perversions as its main attraction, Titan had more night life than any other spaceport in the galaxy. Tourists who could afford to come this far could afford to spend money for shows, restaurants, and night clubs, to most of which a Spacer's earring entitled him for almost nothing.

And there were always the stewardesses. They worked in three shifts on the shuttles from Mars, Io, and Callisto—one of them

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to every ten passengers, which meant that at least ten percent of every shuttle's list was composed of young, attractive, personable girls, making Titan the attraction for Spacers that it was. And Spacers, young, daring, with money to burn, were a main attraction for the stewardesses. It worked out well

A towel around his waist, Lacey buzzed the hotel desk for a list of stewardesses checked in at the Hilton. The list, always available, was sent over every day by the girls themselves. Lacey knew that more puritanical elements disapproved of the custom, but it saved more than time. It meant an almost always good date since no girl would allow her name on the list unless she was out for the fun Titan offered.

Ten minutes later, he had himself a date for the evening. Linda Ngana was African—almost six and half feet tall—and with her shuttle in Float Three for repairs, she had no way of knowing when she would be going back to Mars. It was pretty much what Lacey wanted: if the girl was fun, they could head via groundcar for the Alps. He had never been skiing before and wanted to try it. Titan, with its great ranges of mountains, was regarded as the finest spot for the sport in the galaxy.

Eight days later, the battered, bloodshot Lacey kissed the equally battered, bloodshot girl good-bye at the foot of the shuttle. It had been one hell of a date, Lacey reflected. They had done the town the first two nights and then sped for the Alps and three days on the ski slopes. He managed to get them tossed out of one lodge when, for the sheer hell of it, he started a fight with the five-man crew of a shuttle craft. Linda joined in—on his side, thank God, for at six four she was bigger than most men—and the two had walked over five prostrate bodies, laughing and kissing one another's bruises, right into the arms of the local militia. Asked to leave, they shifted to another lodge where they rested, or tried to. Linda's idea of resting included dancing all night. As the shuttle closed behind her, he was holding a fence for support and patting a very close to empty wallet.

He had needed the holiday and it was worth every credit, but now he needed a job, a means of and a reason for, existence. He dialed the clerk and asked that the help-wanted ads be sent up. Like any other spaceport, Titan was a job-hunter's Mecca. There was always a shortage of workers from space pilots and medical technicians to bartenders—who listened, unlike machines—and cargo handlers. Machines, no matter how powerful and efficient, could not adapt to any more than one or two jobs and man, for all his weaknesses, was pound for pound, often the best

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machine available. He poured a drink and leaned back to wait for the list.

He started a day later as hunkey and cargo handler at the spaceport. The half hour of isometrics all Spacers were required to take came in handy as he and other men muscled into a hundred cargo docks and holds the equipment and merchandise destined for every corner of the universe. Scotch and tobacco from Earth, industrial diamonds and cutting tips from Mars, furs and rare earths from Borman and Kennedy, machinery from the asteroids and Pittsburg, plants and animals from every planet and moon, metals and meals, the stuff of which commerce and trade had been made since time began. It took him the better part of a week to learn the job—where to fit the magnets that held machinery better than tie-downs could ever do, the tricks to save every precious inch of space aboard the tightly packed cargo rockets, how to check for pilferage, where to store perishables, how to make off with an odd bottle or small item. He quit two days later.

It was too much like work. Any military or pseudo-military organization escapes labor-management problems of low pay, bad hours, and abysmal working conditions by being what it is: the last refuge for lazy men. It's a fact, however blasphemous it may seem, that ninety percent of the time, most members of any military organization have nothing to do. Floors, decks, and bulkheads don't have to be cleaned twice a day—not if that paragon of cleanliness, the housewife, does it only twice a week—but they are in the military, simply because there is nothing else to do. Labor and management both realize this and things proceed from there: if the bulkhead is cleaned, labor works off its resentment and occasionally the paint itself, thereby costing management money. Once there is no paint left, it is labor's job to repaint the bulkhead, which job is then done with the greatest waste of paint possible short of outright criminal negligence.

Labor's other refuge, the one on which a thousand stories have been based, is that of gold-bricking, goofing off, call it what you will—the art, and it is an art, of doing nothing. No one has developed this skill to a higher degree than the military man. He thrives on inactivity, on putting something over on his hierarchy of bosses. He brags about how little he has done, and discusses the means of getting out of work with the passion of an artist discussing brush techniques.

When the work comes, the real work, the thing he is paid his pittance for, he is ready and all the energy he has saved by avoiding busy work is used for whatever needs to be done. And if the job to be done entails danger, lack of

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sleep excessive heat or cold so much the better: it is ammunition for his real war—that against the management. Two days without sleep furnish him with excuses for a week of sleeping through reveille and muster. A day without food entitles him to steal seconds, cadge from the galley, and lie about his privation to buddies who don't believe him but who lie about their enforced diets. Too much heat entitles him to all the ice cubes he can hold. Too much cold to all the coffee he can drink during working hours. It is not a vicious circle; rather it is conducted with a good deal of honor, humor, and irony.

But this hunkey work, this job, this muscling of crates, boxes, and cartons eight hours at a stretch, punching in on a clock, was not for a Spacer. Eight hours of manual labor—whom he always thought was a Mexican—was enough to drive a normal man, like himself, up the proverbial wall. Accordingly he handed in his time card, drew his pay, and went back to the barracks.

Six hours later, he was breaking in as a bartender at Spacer Joe's. Joe was not a Spacer, but the tourists never knew that: one earring looks pretty much like another after three drinks. But he paid well, handed Lacey a fifty-credit note when he saw the real earring.

"You're a real Spacer?" he asked, eyes bulging.

"Yuh." Lacey was playing the strong, silent role.

"You quit, huh?"

"On leave."

"But you want to work?"

"I'm money mad."

Joe liked the logic, hired him. He fired him three hours later when an angry Lacey, tired of being called "Boy," told a tourist's wife to blast off.

Lacey apologized, thanked Joe for the job, walked from behind the bar, substituted bar jacket for civ-coat, and joined an attractive brunette to whom he had just sold a drink. She smiled, let Lacey buy her two more—while he had ten—and listened. She listened well. She didn't have much choice.

"Iss beautiful out there," he said, remembering, "all the stars and planets and nebulas, uh, nebulae, an' the comets an' everything. Jus' beautiful. An' when you go into Jump—thass why I quit—I didn't like it—thass beautiful, too. Because there ain't nothin' there. Nothin'. Iss just black an' you can't see. Like a great big, black hole. Pretty."

He waved for another drink. "I'm a jockey an' a scout ship pilot. See a scout ship is little—Y'ever see one?" She nodded: as a stewardess she'd seen just about everything at least once.

"Iss real good job. When we go some place, like a planet or a moon or some place nobody ever been before, I fly down and bring the

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bio-techs an' geologists an' everybody. I'm the first one—me an' the techs. An' when everybody comes to colonize—if they can colonize—they put up a monument with our names on it. An' my name's on three of 'em. Right there—Jim Lacey, Pilot. An' sometimes I fly out to a' asteroid or space junk just to look at it.

"It's beautiful there, too. All alone. An ' you can see the ship 'cause it's lighted. An' then we check out whatever it is we landed on—for mining. I help the geotech with that, too. You want 'other drink?"

"No, thank you."

"You're a nice girl."

"Thank you."

"I'm drunk."

"Yes, you are."

"An' I'm a Spacer, an' I shouldn't be drunk." He took a deep breath of the bar's polluted air, stood up slowly and deliberately, didn't quite pull it off. "Thank you for listenin', Miss," he said. She nodded, smiled. Staggering and swaggering, he left the bar.

When he awoke next morning there was someone about an inch high standing behind his forehead, trying to kick it out with steel-toed shoes. Bourbon and a pill chased the man away and once a cold shower had restored him to almost a state of normalcy, he flopped into the couch, his hand curled around a cup of coffee.

He felt like hell, lost, lonely, and miserable. He'd made a fool of himself, that much he thought, and destroyed his chances in the civilian labor market. Man-shortage or not, employers would take a dim view of men who broke customer's arms and quit high-paying jobs a week after taking them. As far as friends went, he knew no one: a Spacer's friends were the men he worked with, slept with, and got drunk with. And with the ship some half parsec away, he had no friends.

He missed the ship. He wouldn't have admitted it to anyone, would *have denied it vehemently if asked,* but he did. Damnit, it was good not fighting gravity twenty-four hours a day, being able to run on three hours sleep because your body never got tired of carrying its own weight. He missed the food—humans were never made to eat animal flesh and dirt-tainted vegetables anyway. He missed the card games, rooms in which you could touch everything without having to walk a mile to get them, the smells of oil, perspiration, and plastic.

And, most of all, he missed Space, the endless reaches of the universe with their shifting banks of stars and galaxies, things in the midst of nothingness that became luminescent and gaseous in the imperceptible shifting of the ship. And hyperspace, where the nothingness became a blackness beyond a blackness, like staring into the

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open mouth of God. He missed its vacancies, its wonderful, terrible power, its vastness, its cleanliness. He missed the stars and constellations that were as different as the waves of the sea.

He didn't miss Jump. Even here, his feet on a rug, the coffee rapidly chasing the hangover, he thought of it and shuddered. Jump frightened him: thinking of it, coming out of it, during it, and going into it was all a nightmare. He shook, threw up, twitched, sweated, and wanted to scream constantly. Thanks to Dan, who locked the door to Medical each time, only one other man knew the extent of that fear.

But you don't walk away from fear, he thought. It isn't inanimate or outside you, like a rock, a door, or an ex-girl. It is as much a part of a man as his thoughts, his emotions, his arms and legs and liver. Each man is allotted a quotient and each man has it. It can only be survived, lived through, never conquered or chased or driven away. It has to be lived with, like acne or blindness or amputation or any of the other thousand things that a man can let cripple him.

If a man lets it cripple him. All men are afraid. He had been afraid before: when the meteor almost took his head off, when he thought he was going to pile up on Callisto Float, a thousand other times. Fear made you think, plot, and drive yourself when heart and soul and muscle said, "No, it can't be done." It was fear—of death, disgrace, of dying without a fight—which screamed back and made you go on. It was a friend—if you let it; or an enemy—if you let it.

To hell with it, he thought. I'll take pills, booze, drugs, shots if I have to. Maybe I'll just lie there and go nuts for an hour. I'm a Spacer, damnit, and my ship is undermanned.

He stood up, strode to the comm circuit, punched the button.

"Desk."

"Lacey, 303."

"Yes, sir."

"Message Outgoing for me. I want the first flight out of here to Grissom Station in Sector Three Zero. Cruiser, Cargo, anything. That's on a Priority One, Status One basis. All my personal data are at your desk. Please have my orders ready ASAP. Got it?"

"Yes, sir."

"Good. Can you send a message through Main Comm for me?"

"Yes, sir."

"Right. This will be on Instant Circuit, Priority One, Status Two basis—I'm cleared. It's to *Stalwart,* LS-One-One-Nine. Yamota, Daniel. Message reads: 'Fifty on way. Hand carried.' Sign it 'Lacey.' "

"Yes, sir. Is that all?"

"That's it. Thank you." He closed the circuit, looked around the room. Wait'll I tell them about Linda, he thought. ■

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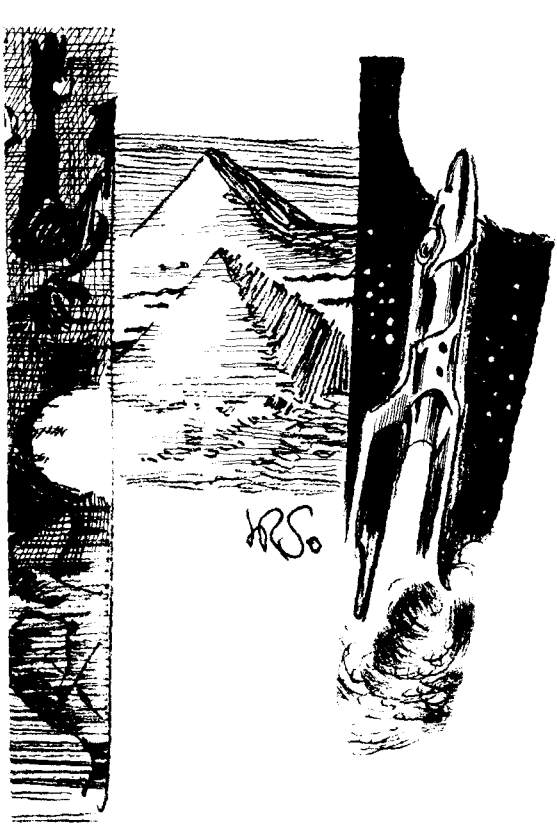

compassion

There's nothing so comfortable and satisfying to people as a stable, undisturbed cultural enclave. Nor, of course, is there anything more destructive . . .

J. R. PIERCE
Illustrated by Leo Summers

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When Sari reported for assignment at the Urban Affairs headquarters that morning, she was told to take a busload of outsiders through the indoctrination lecture in the Assembly Hall, and then see them off on Guided Tour 3. After they had been instructed, admonished and put aboard the tour car, she was to come back and wait for a Mr. Mark Freeman, who would arrive at eleven, and who wanted a personal guide.

The busload were teen-age schoolboys, uniformly dressed in their visitor's uniforms, but distinguished somewhat by name tags, height, complexion, hair color and manner. She could see from the way that they looked at her and at one another that they enjoyed her appearance. Much as that pleased her, she saw to it, with all her self-discipline and twenty years, that they respected her authority and herself. Despite the fact that she was barely five feet tall, shorter than many of them, they did respect her. Young men, and even older ones, were sometimes more forward, but experience had given her confidence that she could charm, chill or subdue any male. When men really wanted to see the orgiastic cults, or to participate in the love-ins, she took them there and arranged to call for them.

Mr. Freeman, when he arrived, proved charmer as much as charmed. He was only half a foot taller than she and only a little less slender. His skin was as black as hers, but his features were sharp where hers were round and his skin furrowed without fine wrinkles where hers was smooth and young. How old was he, she wondered. Fifty? More? Whatever and whoever he might be, he was her charge from the moment she shook hands with him and told him her name, which, after all, was on her tag, as his was on his own.

"Don't you want to sit down and discuss your tour?" she asked. "And would you like coffee, or tea?"

"Yes," he replied. "No, nothing now. Later, maybe. But perhaps you'd like something?" he said, smiling.

She smiled back and shook her head.

"The indoctrination lecture?" she asked.

"I've—been here before," he replied.

"Then just tell me where you want to go and I'll make arrangements."

He closed his eyes a moment before he replied.

"There are so many things . . . I suppose you get tired of some of them." He smiled. "Is there any place you'd *like* to take me?"

They got into the small open electric car still discussing their destination. They agreed that it shouldn't be baseball in the astrodome, but they saw the building when they stopped to go into the tiny Great Hall of Cooper Union,

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where a legendary man called Lincoln had once spoken. A combo was playing on the little stage, and the small auditorium was packed with city folk.

After that, they went on farther south and west, past City Hall and the Stock Exchange, a tenantless monument, now, like the tall buildings that stood beyond it, between the green parklands where others had been. They stopped and strolled through the yard of St. Paul's Chapel looking at the gravestones, then drove south to the Battery and had lunch at Fraunces Tavern, where another legendary American had eaten.

It was a leisurely, guileless day. Sari used her guidebook information, and much she had read that wasn't in the guidebook. But they talked mostly about what met their eyes: trees, birds, buildings, people. It was late afternoon by the time they had drifted north, and then east through Central Park to the Metropolitan Museum of Ethnic Art. By the time they had admired the bold and brilliant exhibits they were hungry. They ate beside the pool, pleased by Milles's figures, which seemed very strange but lively and young.

"How shall we spend the evening?" Mark asked. He put his hand on hers and looked pleasantly at her. "Will you spend the night with me at the hostel?"

She looked pleasantly back.

"I don't," she said. But her hand was in his, a friendly gesture, as they left the building.

"May I see you home?" he asked.

She agreed readily, amused inside. And if Mark was surprised when he found her mother, her father and her eleven-year-old brother, Suleiman—Sully for short—in the living room of the apartment on upper Fifth Avenue, he didn't show it. He smiled pleasantly as he was introduced to each in turn. Then they sat down and talked, talked, talked.

Sully was full of his tribal group, the Black Panthers. He was preparing for his initiation rites.

"We have to stalk the lions through the jungle, crawling silently so not a plant moves. And then when we see one we jump up and throw our assegais and kill them and Y E L L—"

Mark did not start at Sully's shout—he seemed spellbound—but the yell really did startle Sari.

"Sully!" she said. "You don't really kill them. And they aren't really lions; they're boys from another tribe."

"They're totem lions," he said. "You Christians don't understand. Dad understands. Don't you, Dad?"

His father nodded mechanically, his eyes glued to the TV screen, a miniature earphone in one ear.

"And in Cetewayo's day it wasn't lions, either; it was honkies. Every

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warrior had to kill a honky before he was a man."

Sully glared defiance at them.

"Sully!" Sari said. "Mark . . . Mr. Freeman . . . is an outsider."

Sully looked crestfallen at his best audience.

"I'm sorry," he said. "Even if you *are* an outsider, you aren't a honky. I wouldn't even call *you* a hick," he added. "I'll bet that you have been initiated yourself."

"More than once," Mark said.

"How?" Sully asked. "How?"

"That is the sort of secret men must keep," Mark replied. "But some things men can tell. Who was Cetewayo, Sully?"

"He was a Zulu chief, and he led his warriors and killed millions of honkies," Sully answered. "And then he was betrayed and killed. But his spirit didn't die." Sully intoned solemnly, "Cetewayo's spirit lives in the Black Panthers."

Sully's mother looked up from her knitting.

"It's time for you to do your homework, Sully," she said. "Go on now, go to your room."

Sully kissed his mother and his sister, politely said, "Good night, Mr. Freeman," to Mark, then stalked with majestic dignity past his father, who was still glued to the TV set.

"He has to cram on his Swahili for the initiation," his mother said. "I do wish they'd teach them more in school."

"Mother's head of the education committee of the PTA," Sari told Mark. "Swahili isn't required any more; they all have to learn Spanish. Mother believes in the classical languages."

"I'll tell Mr. Freeman, dear," she said, and she was launched into her favorite subject.

Sari, a little nervous at this, was soon relieved, for Mark seemed deeply interested in school affairs. But as she listened, she began to feel uneasy again. She sensed that he knew more about these things than her mother, yet would never let either of them know if he could help it. When he looked at her during the conversation, he found her staring at him perplexedly. He seemed to lose the thread of the discussion for a moment.

I've taken him down one, she thought. *He didn't get away with it with me, and he's annoyed with himself.*

Mark was a good sport. He finished with her mother adroitly, brought the talk around to the long tour he had had with Sari, praising her as a guide so that her mother smiled with satisfaction and agreed that he must really go now. He sent a good-bye to Sully, and Sari's father nodded from beside the TV as they left the room.

"You will guide me next morning?" Mark asked at the door.

"Of course," Sari said.

"Good-bye, Sari."

"Good-bye, Mark."

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They parted the best of friends, he looking after her as she walked away; she quite consciously, and with considerable self-satisfaction, not looking back. *He is a charmer and he knows it,* she thought. *But he found me charming, too.*

That night was a good night. She loved Sully, and her mother, and her father dearly. She slept soon and dreamlessly and woke fresh and happy in the morning. It was a warm and beautiful day.

She and Mark had agreed to have breakfast together, in order to plan the day. They dawdled over the meal, talking about yesterday, about her family, about the people at other tables. When they had irrevocably finished, they had made no plans together. But, Mark had.

"Where can we be alone and talk some more?" he asked.

She thought a moment.

"If you like the outdoors, Grant's Tomb," she said. "No one goes there any more."

So they drove far up Riverside Avenue and sat on the terrace, looking across the broad and empty Hudson toward the wild forests of New Jersey.

"What is it?" Sari asked.

"I've seen your city," Mark said. "Would you like to see my world outside?"

What was outside, she wondered. Wilderness? Men and women were outsidemen like Mark. Food and materials came from outside, and power and water. Someone bought the city's products—ethnic art, video recordings, costumes and musical instruments. Outside had something to do with the Bureau of Urban Affairs, that huge complex on the East River between Forty-second Street and Forty-eighth Street, where Sari worked as a guide. But the city was the real world; it was her world. Was she interested in outside? She had never thought. Should she be interested? Shouldn't she? Did anyone ever go outside? If they did, why did they go?

Sari looked at Mark very directly.

"Would I be safe?" she asked.

"Of course you would," he said a little severely. "You trust me, don't you?"

"I do. But . . . how—?"

"Did you live in at Urban Affairs when you took guide training?" he asked.

"For a few weeks," she replied. "But I saw my family occasionally."

"*You* could convince them that there was a special course," he said. "Special duties, perhaps."

She smiled.

"I could do that," she agreed. "But I'd miss them—and my groups —my friends."

"Anyone special?" he asked.

No; there was no one special.

So they arranged it. In a week she was to go.

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The interview with her chief at Urban Affairs turned out to be a formality. Outwardly, she remained Sari, tender with her parents, friendly in her groups, pleasant, but firm, with those she guided. Inwardly, she alternated wildly among nostalgia almost to tears that she would leave what she knew, excitement at the prospect of seeing outside—with Mark—and an unfamiliar worry that things might somehow break her confidence in the Sari she had made herself.

The actuality came upon her in stages. First, that morning, there was Urban Affairs, completely familiar. Then there was Mark, smiling, friendly, casual, comforting where no comfort had been asked. Then there was a car—not a bus—through the tunnel, and past wooded, uninhabited areas beyond.

The unfamiliar came with the airport—seating themselves in a buslike box which was wheeled out and into a huge winged machine. Mark held her hand and told her that perhaps she should close her eyes as the machine rushed across an immense paved area and finally rose into the sky. But Sari watched with eyes open, confident in him and his world, savoring each unexpected experience before her practical mind began to question. They flew high over forests and fields, dispersed houses and isolated complexes of buildings of various sorts.

"Outside is so big," Sari said.

Mark nodded.

"And this machine that carries us," she said. "It's so wonderful. Not like ethnic art," she added dutifully, "but different."

"It's a machine, just like buses and electric cars, and refrigerators," he told her.

"But I've never really thought about machines and where they come from," Sari said. "I suppose men must make them."

"Men do make them," he said, "or they make machines that make them."

Sari was unguarded, thoughtfully curious, and humble as he told her of science and engineering, through which men learned how to fly over the earth, and to the moon and the planets, and to make TV sets and more complicated things, so that men were able to remake and rebuild the world. And, even more remarkable, men were able to learn a little, a very little, about that most complicated and miraculous thing of all, man himself.

It was an avid, excited, younger Sari Mark took from the plane to a small helicar and flew past scattered houses to a particular house on flat land near huge heaps of earth and rock, which Mark called foothills. These stood below towering heaps of earth and rock that Mark called mountains. But it was a determinedly self-possessed Sari who walked toward the house with Mark after they had landed. Out-

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side might be huge; machines might be marvelous, but outsiders were people. Sari knew how to deal with people, in the city or outside.

The house seemed strange to her, a sprawling, one-story building, uneven even in height. As they walked toward it along a path, she thought of Central Park. But this path through grass, trees, bushes and flowers was of white gravel, and there was no one in sight. Yes, there was: one man, spry, old, with white hair. He was busy trimming a bush. Mark called to him.

"Hi, Sam," he said. "I've brought a guest."

With deliberation, the old man turned off his electric shears, laid them down, took off his garden gloves and laid these beside the shears, and then walked slowly over to where Mark and Sari stood on the path.

"Sari, this is Sam," Mark said. "Sam, this is Sari, our guest."

Sam shook hands with her and said hello.

"I hope you'll like it here," he added. "Most of the guests do—especially my vegetables and cooking." Then he turned to Mark.

"Grass needs cutting," he said. "And someone to clean up the twigs."

"I'll remind the boys," Mark replied. He turned to Sari.

"Sam is an artist," he said. "The young ones have to do the dirty work."

Sam beamed and went back to his trimming while Sari and Mark continued on toward the house, passing over a small stream from the foothills that ran close to the walls. They entered through a wooden door which stood open and walked through a variety of rooms and halls, until Mark opened a door, motioned Sari in, and said, "This is your room."

The window looked up toward the hills, the mountain. She could catch glimpses of the brook tumbling down the near slopes. The walls of the room were of wood, or seemed to be. There was a bed on the right, facing the wide window across the end of the room, so that you could lie there and look outward and upward. Mark touched a switch on the table at the side of the bed; the window darkened and became a silvery mirror. The room was now lighted by a soft glow from the ceiling.

To the left of the door was a sort of desk, with what looked like a flat TV behind it. Then, there were a closet door, and a door to what turned out to be the bathroom. In a wide space beyond, between the bed and the window, were a table and two chairs, and an easy chair against the wall.

"You can eat here, if you wish," Mark said. "Or learn," and he turned toward the desk.

But the bathroom was most exciting, with its table and mirror and fresher.

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"Doesn't the soap get in your eyes?" Sari asked.

"It does, but it isn't soap," he said. "It won't make them smart."

Then he explained the clothes, which were strange to her, and told her he would come for her in half an hour, so that they could have lunch.

Lunch was sandwiches, fruit and milk, which they picked up in a large room that Sari thought must be a kitchen, though such a kitchen she had never seen. On one side, over counters, windows looked out on the valley. There were doors on the other side and at the ends, and cabinets which might be refrigerators and stoves. After suggesting several things to her, Mark got bread, butter, cold cuts and the rest from a cabinet that was a refrigerator and prepared food as they talked.

"We're a little late," he said. "The rest are probably out by the pool."

They took their food through one of the doors to a terrace surrounding a huge pool. Wings of the house flanked it to the left and right and the mountains rose before them. A scattering of people at the small tables looked around and then rose as they entered. Mark introduced Sari to them.

"My son, John," he said, as a lighter, smiling, younger version of himself shook hands with her. John is easier going than Mark, Sari thought.

There were John's wife, Susan, a small, pretty woman, and two children, Ted and Tina, about nine and seven, Sari judged. The others were two young couples about her own age, Jim and Barbara, and Bob and Joan.

"Sam says the lawn needs mowing and the twigs have to be swept up," Mark told Jim, the elder, who made a face at Bob. Mark noticed it.

"We live here," he commented.

The others were through with their meal. They left, carrying plates and glasses back to the kitchen. Mark and Sari sat at one of the tables, eating and talking and looking at the mountains.

"Do you like it?" he asked.

"It's beautiful," she said. Then, "But don't you find it lonely?"

"You mean, there aren't crowds, and groups?" he asked. "But there are people. Are you lonely?"

He had known just what she meant, she decided. Sully would have been lonely without his tribal group; her mother without a continual contact with family, neighbors, PTA, people in stores, and just crowds of people enjoying the same things she did.

"No, I'm not lonely," she said. She smiled warmly at Mark, who smiled back. "Besides, there are others here. Who are Jim and Barbar, and Bob and Joan?"

"They're on service," he said.

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"They take care of things. That is, what Sam doesn't do. Sam's a gardener and cook," he explained. "And all four study with me, and help me with my work."

This wasn't very clear to Sari, but she let it slip past her mind.

"Are they married?" she asked.

"No," Mark said. "Sort of—paired. It makes it pleasanter at their age," he explained.

John and Susan. Jim and Barbara, Bob and Joan, Sari thought. *Mark and who?*

"My wife and I separated long ago," Mark said. "We both felt we wanted something different."

"Do your son and his wife live here?" Sari asked.

"He's on a sort of vacation," Mark said soberly.

I think something is wrong, Sari thought.

But then, she looked at the mountains behind the pool, and at the pool itself, and they were beautiful, beautiful in a way she had never experienced. The mountains, she decided, hadn't been made, like the Astrodome, or the Metropolitan Museum of Ethnic Art, or her family's apartment, or even Central Park. There, men had arranged everything, even the forest through which the Black Panthers stalked the Lions. The mountains just—were. Like the stars, she thought.

She told Mark about the mountains and the stars. Yes, they were there, he agreed, through the lives of many men. But they had not always been there; not the mountains, nor even the stars. Sari found the thought awesome. Neither had her city been there forever, she considered. She had never really thought of this before. There was a past, of course. You learned about that in African history. But that was apart from oneself. Life itself had seemed permanent, unchanging. It was the way it was.

"I have a few things to do, now," Mark said. "Do you want to come along?"

She hated to leave the terrace and the mountains, but she wanted to be with Mark. So, she followed him through the door to the right, past various rooms, and finally to a sort of office. Here there were no windows. There were screens behind and above the desk, and a keyboard, like those in her bedroom, but larger. To the left, at one end of the room, there were a table and comfortable chairs.

"You sit there," Mark directed. "No one will notice."

What followed reminded Sari of one of her mother's PTA meetings. Besides Mark, only a half dozen people were involved. They appeared against different backgrounds, oddly disjointed, on the screens behind the desk. Their voices mingled naturally, however, and soon Sari began to feel that they were all present, all together.

There was an agenda, business

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of some sort. It was very strange. The talk was fast and lively compared with the endless harangues at her mother's PTA. Occasionally the talk was of particular people and whether they could, or could not, do something or other. Mark's observations were good humored, interesting, and seemed shrewd. At least, the men on the screens listened attentively and sometimes chuckled. Sari felt proud of him.

Mostly, she could not even guess what was going on. The subject, the words, the meaning all were strange to her. At one point Jim came in and gave some sort of brief, unintelligible report, full of facts and figures. He left after a few questions. Sari's mind wandered over the city, over this world outside, over the house and Sam, John, Susan, the children, Jim and Barbara, John and Joan, and Mark and herself. Was Mark somehow—paired? When she looked at him and the screens again, she saw that it was a different group and a different meeting.

They had dinner that night in a tall, long room which Mark called the museum. To the sides, ethnic art covered the walls and filled cases. There were assegais and painted shields and bright cloth. There were Benin bronzes and tiny gold weights and gold-encrusted tribal stools.

"Which do you like best?" Mark asked, nodding to the walls right and left.

This was a perplexing question. At first there seemed no difference. Then, as she stared, an impression came to Sari that the objects on the right wall were somehow better. Not better made. That wasn't it. Not brighter. No, somehow more vivid, more real. That Benin head, for instance. It was living. And yet, it was more than life.

"I like these," she said, moving toward the head.

She looked at Mark to see if he approved. He seemed sober, perhaps a little disturbed.

"You have a sharp eye, Sari," he said.

"Who made it?" she asked, looking at the head closely. All it said was "Benin, *circa* 1350." "What does *circa* mean, Mark?"

"It means about that time," he replied.

"Then, this is real African?" she asked.

He nodded.

"And the other?"

"From the city," he said.

She looked back and forth between the two sides of the room. In some way that she could not explain, ethnic art had changed for her.

Sari and Mark ate at the far end of the room, where there were chairs, couches and something Mark called a fireplace, which had no fire in it now. They sat looking past the exhibits, toward the far end where a huge grand piano stood against the wall. Sam

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wheeled the meal in on a sort of cart which became a table.

"The corn is a new variety, Mark," Sam said. "Fifty days." He turned to Sari. "I've got corn and peas outdoors most of the year, now."

"Sam likes to grow things outside." Mark told her. "But he really has fruit and vegetables all year, inside and out. Don't you, Sam?"

"Outside's best," Sam said. "Peaches inside, now. Hope you like them." He turned and left.

"Sam has a green thumb," Mark told Sari, and then had to explain the phrase.

"He isn't—very bright, is he?" Sari asked.

"He's bright enough to do what he does. And he's happy here."

"Jim and Bob have to mow the lawn and clear up after him," Sari said.

"The young do that sort of work, no matter who they are," Mark told her. "They're lucky they can work here. If they were no brighter than Sam, they'd be in a factory, or on a farm, or cleaning out sewers."

"But how is it they take care of your house?" she asked.

"Because they'd rather be here," Mark told her. "I have lots of applicants who want to study with me."

She looked puzzled.

"Oh," he said. "I see. I pay their basic wage. Otherwise, some company or the government would. And I'm lucky they want to come here. Bright ones prefer a laboratory, or a hospital, to most houses."

"And Sam?" she asked.

"He worked on a truck farm," Mark said. "Then, when he didn't have to work any longer, he wanted to keep on gardening. I'm lucky to have him, too. And he loves it here."

Sari looked at him silently.

"And your son?" she asked.

"He's my son," Mark said. "This is his home when he wants it."

"But, you haven't said anything about him."

"What would you say, Sari?" he asked.

Sari knew what she thought. It wasn't what she said.

"I don't know."

"You should say, 'He has his father's charm,' " Mark told her.

"He does," Sari agreed, smiling. "And Sam's wonderful, too."

They laughed, got up and looked at the things in the museum. Then they went to her room, where Mark showed her how to use the keyboard and screen in the corner. He typed a list of things she might want to explore—news, science, industry, architecture, music, theater and live entertainment which, he explained, was like the city's TV: things that were happening now. He made a few suggestions under each heading. The list appeared on the screen as he typed. After a few corrections, he pushed a button and the list emerged from a slot, printed

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on a card with a heading, "For Sari," that had gotten there somehow.

Sari smiled and thanked him. She was fascinated with the device. She could hardly wait to use it in exploring this new world. So, she rose and just stood there, smiling and silent.

"Is there anything else I can help you with?" Mark asked.

"No, thank you, Mark. No, thank you very much."

"Then I'll say good night," he said, smiling back. "Good night, Sari, and sleep well."

He kissed her gently on the forehead.

"Good night, Mark," she said.

She didn't sleep well. She scarcely slept at all. She called one thing after another to the screen. There appeared to be hundreds of channels of live entertainment: music, plays, circuses, games and sporting events of all sorts, some by night and some by day. Some were in English and some in languages she did not know. She realized that the programs must come from all parts of the world.

The news she found unintelligible. It spoke of and showed her people and events that had no meaning for her.

The recorded programs interested her most. Here were huge farms which fed mankind, and she could see the seasons pass—the sowing, the growing, the harvesting, the processing. There were mines whence ores came, to be smelted into iron, aluminum, copper, silver and gold. There were wells from which oil flowed, to be turned into fanciful things in complex processing plants. There were factories where young people, and a few who were older, directed machines which made other machines. There was a spaceport, whence ships were sent to the moon and the planets. There were huge schools where young men and women learned how to do such fantastic things and laboratories where they learned how to do them better.

The city had always seemed large and complicated to Sari, but she had never before thought of it all at once. Now a whole strange, huge world passed before her eyes. It was a world that men were making every day. *How can they?* Sari thought. *How can anyone?*

The arts of man were as amazing. Huge and primitive stone pyramids. A lovely, fragile marble building with pointed domes. Columned temples, spired cathedrals, towered chateaus. All that she could grasp was a sense of variety and confusion. This building; had she not seen it before? Or, had she seen another like it?

There were pictures strangely unlike ethnic art. In some, the faces and figures were brighter, more solid, somehow more real than life. Other, vaguer pictures seemed more

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sunny than sunshine. There were pictures that looked like nothing, not even the patterns of ethnic art, pictures that seemed to be beyond comprehension.

Hours passed as Sari skipped from one thing to another. I mustn't hop about so much, she thought. I must settle down and watch something until I understand it.

What she was watching then was the beginning of a sort of musical play, sung in English and acted by people in rich and fantastic costumes in a fantastic setting. The play was about the marriage of a young couple who stood in some relation to an older man. The older man wanted to have sex with the young woman. Was the young woman his slave? But she and the young man were bright and impertinent. They were outwitting their master.

The music was strange at first, but clear and gay. Something that a very young man sang—he was a girl, really—was lovely and moving. It was a strange world that she had found within a strange world—

Sari was awakened by a beeping sound. She was still in the chair before the screen, but the screen was blank and it was morning, not night. She pushed the answer button as Mark had taught her and his face appeared on the screen.

"Did you sleep well?" he asked.

"Well enough," she said. She was as much excited as tired. "Mark, can I go and see things, really, not on the screen?"

He looked thoughtful.

"Maybe. But now is now. I'm going to swim in the pool before breakfast. Do you want to meet me there?"

She nodded and said goodbye.

The swim increased her appetite. In the kitchen, the young people were making bacon and eggs for any who wanted them, and Sari did. She talked to Mark about seeing things really. It seemed that some things were near and easy to see and some were very far away.

"I'll show you a map, later," he said, "and tell you how to locate things. Then, when you have chosen, we can see some nearby things mornings."

"Soon," Sari said.

"Soon, of course," he replied. "And right now we'll look around here, from the air."

They flew over the hills and the mountains, spying out brooks and falls, trees and cliffs, and in one place a level meadow. Then they flew out over the plain. There they saw houses, some smaller, some larger than Mark's. Sari saw that roads ran among the houses and that farther away there were clusters of buildings along broader roads. Mark told her that these were stores and schools.

"Children can learn by screen,"

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he said, "but they need to be together sometimes. Different groups go on different days."

Sari thought of Sully and his tribal group.

"Children must always be like that," she said. "And men and women, too, I think."

The morning slipped away, and so did lunch. Sari felt a little sleepy, and when Mark went to his work, she decided to lie in the sun beside the pool and perhaps swim later. She dozed off. She was aroused by splashes and shouts. Ted and Tina were in the pool with three other children, a girl about Ted's age, a somewhat older girl and a gawky boy taller than Sari; he must have been twelve or thirteen.

Sari got up and walked over to the edge of the pool.

"Hello, Ted. Hello, Tina," she said.

The commotion stopped.

"Hello, Sari," Ted said. "I'm sorry if we woke you up."

She shook her head, smiling.

"Sari, this is Tom, Helen and Betty," Ted said gravely, proceeding from elder to younger. "They are our friends," he added.

Each said "How do you do, Sari," and she greeted each in turn. She went into the pool herself, and they raced and threw a ball to and away from one another and swam under water, and floated until they were glad to rest in the sun. Then, somehow. Sari found herself telling the children stories, as her mother had told stories to her, and as she had repeated them to Sully and to her friends.

Some stories are for the fears of night. Sari had stories for the day, too, and a fresh audience. She held them with tales of fighting and courage, of the beleaguered daughter of a chieftain, splendid in flowers and jewels, of evil men, of the poor but brave and clever warrior who overcame the evil men. Tension grew in her audience. When she had finally ended, Tom, the tall, gawky eldest shouted, "Sari is a chief's daughter."

Sari smiled, and the other children took up the shout.

"We'll get flowers," Tina cried, and they all rushed off to Sam's garden. They came back excitedly with hastily snatched handfuls of daisies, which they somehow wove into a wreath which they put around her neck, and two red roses, which they asked her to put in her hair.

Sari stood before them, short, young and splendid, her eyes sparkling. Slowly, solemnly, rhythmically, she began to dance, as she had been taught in her cultural group when she was a child, clapping her hands in time with imagined drums.

The children watched for a moment in wide-eyed surprise. Then suddenly, Tom let out a wild shout, and putting his hand rapidly to and away from his mouth, he gave vent

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to a raucous ululation. The other children looked bewildered.

"Sari is an Indian," Tom shouted to the others. "We're all Indians."

Suddenly, the children were circling Sari, prancing awkwardly and gracelessly, bending forward and back alternately, hooting and shouting.

"Sari is an Indian, Sari is an Indian," they cried.

Sari stood silent and perplexed, not knowing what to do.

"Indians don't wear clothes," Tom shouted. "Take off your suits." He slipped from his trunks. Helen and Betty imitated him, and the others followed, amid their shouting, hooting and stamping.

"Indians don't wear clothes," Tom shouted. "Take off your suit, Sari. And Indians don't wear flowers. Take off your flowers."

Sari was angry by now.

"Children," she said firmly. "Stop. Ted, Tina, stop them."

She might as well have admonished the wind. The children, who were circling her, stamped harder and hooted louder, and all now shouted. "Sari is an Indian," and "Indians don't wear clothes," and "Take off your suit, Sari."

Sari stood silent, vexed, almost fearful. She knew very well what had happened. What was to her pretending and savoring had become for the children identifying, living the fiction. And for the children, the barrier between childhood and adulthood had broken down. She, who was shorter than Tom, had become a part of the fantasy they were experiencing, the fantasy she had helped to conjure up.

What could she do? In her preoccupation, in the children's preoccupation, no one noticed that Mark had come until he spoke, firmly and decisively.

"Stop that," he commanded.

They recognized his voice and they stopped. They were not taunting Indians any more. They were naked, foolish children whom authority had caught in naughtiness. They all turned to Mark. Sari had not realized that he could look so stern.

"Go to your rooms," he said to Ted and Tina. "You others, go home."

For a moment they stood spellbound.

"Go along. Do you want to spend summer in Antarctica?"

The children picked up their suits in trembling obedience, walked away for a few steps, and then fled in panic.

Sari felt humiliated and helpless. She found herself crying on Mark's shoulder, and he was soothing her.

"I couldn't do anything," she said. "I didn't know what to do."

"Children are savages sometimes," he said.

"What is Antarctica?" Sari finally

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asked. "And would you send them there, and *could* you?"

Mark drew back and smiled.

"Antarctica is cold, icy during our summer," he told her, "and I might have sent them there, and I think I *could* if I wanted to. *Should* I?"

"No," Sari said, smiling, "but it's nice to think about doing it."

Soon they were talking cheerfully. Mark told her that they were having a party that evening; there would be company for dinner.

"Then I'll rest," Sari told him. "I was awake most of last night, exploring with the screen."

She did lie down and fall asleep, to wake when it was already evening. But before that, she used the screen to find out what Indians were and where the nearest Indians lived.

In the afternoon, Sari had been drawn too close to the children; in the evening she found that she was too far away from the adults. The party was in the fireplace end of the museum, where she and Mark had eaten the night before. The company proved to be Eleanor, a truly beautiful blond woman, about thirty-five or forty, Sari guessed, and Steve, a wrinkled little man of indeterminate age. The others were John and Susan. The young people weren't there, nor were the children. All the others were old friends, laughing and joking about people and things of which Sari knew nothing. Even Sam greeted and joked with the visitors as he brought in and set up the cart table, stocked this evening with plates and silver and with casseroles, platters and bowls from which they later served themselves.

Everyone was kind to Sari. When Eleanor told her she was very beautiful she felt grateful and warm and looked at Mark, who added, "And very young." Then he turned toward Eleanor. John talked with her a little, smiling and affable. Sari found his words empty. For all his charm and good nature, John was empty.

The others weren't empty. Steve saw her trouble and tried to talk to her while Mark and Eleanor were caught up in a flood of reminiscences. She found that he knew nothing of the city; he had never been there and never bothered his practical mind about it. Of his world she knew, what? Only the house and Mark, and she didn't really understand what Mark did. Nor did she know what Steve did, except that it was somehow connected with Eleanor. She was with five other people, and she had never, never felt so alone in all of her life.

At the end of the meal, Sari realized that Eleanor had left the room. Sam was busy piling things on the cart table. Steve was examining and adjusting three narrow stands, about six feet tall, which had been installed near the grand

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piano. The piano itself had been pulled a little away from the wall. While this was going on, the young people, Jim and Barbara, Bob and Joan, came into the fireplace end of the museum and sat down quietly.

When Steve had the stands to his satisfaction, he looked toward the others, saw that they were all seated and held his fingers to his lips. Sari turned to John, who was sitting next to her, and started to ask a question, but he said, *"Shssh"* and she turned away. Steve went to the wall and touched a switch. The piano end of the room burst into bright light, so that the people around Sari seemed only dimly visible, seated in expectant silence. The door nearest the piano opened. Eleanor walked in, seated herself and began to play and sing—not just to her and the others, Sari realized, but to those—how many out there?—who had set their screens for this live entertainment.

Yet it seemed to Sari that the music and words were for her only. The songs were simple, warm, full of a sad sweet feeling which promised something that she wanted, something that was worth waiting for. She glanced left and right. Men and women were equally entranced. Eleanor is promising them all, she thought. Then she thought, there won't be enough to go around.

The magnetism was real, whether, the promise was or not. Sari drifted back into the spell, for how long she wondered. Half an hour? An hour? More? She had lost all sense of time when, at the end of a song, Eleanor sat straighter and then stretched her arms out and back as if she were relaxing after a difficult task. Something touched Sari's arm, but she was still spellbound.

Eleanor looked down into the darkness of the room. "Mark," she said, "come up and play something for *me.*"

Sari saw Mark rise and go forward into the light, his smiling, dark face as handsome as Eleanor's blondness was beautiful. Sari glanced around and saw that all the others had left. That had been the touch on the arm. She shrank into her chair, dark in the darkness, embarrassed to leave, embarrassed to stay. Then Mark was at the piano, and she forgot herself in watching and listening to him.

What he played was lighthearted and expert, but not as good as Eleanor, she thought. Sometimes it had some peculiar meaning for Eleanor, for Mark would smile quizzically at her and she would listen and nod. Finally he looked at her and began a slower, softer piece. His expression was—fond, Sari thought. Eleanor picked up the tune and sang. Sari saw only her back, but she sensed the compulsion that she had felt earlier. Sari knew, then, that Mark was about to

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have a taste of what Eleanor had promised to everyone. As he rose from the piano and went toward Eleanor, Sari fled in the darkness, silent and furious.

Why? she thought. *Why should I hate her? Why should I hate him? It's Mark's house, Mark's world, Mark's friend. Besides, he's old enough to be my father. Besides, I wouldn't have sex with him when he asked me in the city. Besides, he's good and kind to me. It's just as I should want it to be. Fathers should be handsome and attractive as well as good, or they wouldn't be human.*

Something within her was unconvinced. Before she woke in the morning, she dreamed that Mark made love to her. It was dear. and sweet, and warm, and exciting and satisfying. She woke full of pleasure. She realized only gradually that it had been a dream and that she faced a perplexing day.

Sari had missed the morning swim. It was midmorning, in fact, when she reached the kitchen, and breakfast was long over for the rest. She took fruit and bread and butter and a glass of milk out to the terrace and ate them in the sun, watching the mountain and its clear reflection in the still, deserted pool. She couldn't have said how long she had been there when Mark joined her. He looked happy with himself and the world. *He always does*, she thought, *but I think that he looks happier today.*

"You're late," he told her. "Eleanor and Steve have gone. And where are we to go today, Sari? Have you chosen?"

She looked up at him, thinking of her dream.

"I just woke up," she said. "Can we go now? I want to see an Indian reservation, and there's one near enough to go to in the helicar."

"Are you sure that's what you want most to see?" he asked. "And where did you hear about Indians?"

Then she could see that he remembered.

"Come along," he said, holding out his hand. "We'll take food for lunch from the kitchen; we won't need anything more." She took his hand, and their journey began.

The flight took them about two hours. The country they passed over was progressively less fertile,

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so that there were green fields and trees only along the borders of rivers and streams. The higher lands were dusty, bushy and dry. Occasionally they saw what Mark told her were mines: congeries of buildings and machinery, with green, irrigated areas nearby. Sari thought the country beautiful in its dusty grays and reds, but forbidding.

Finally, Mark pointed out the reservation, chiefly a cluster of drab mud huts on land not quite desert, not quite fertile. They landed at a field a mile away, and a silent man drove them over a dusty track to the village they had seen.

Mark led Sari to a plain wooden building at the edge of the village. As they entered she saw that it was a store. The walls were hung with woolen blankets or rugs, with pleasant geometric designs woven in soft, beautiful colors, black, gray, brown and dull red. Others lay piled below. In the center there were cases with jewelry of silver and turquoise; buckles and pins and necklaces with elongated beads of thin silver. A brownish man wearing loose trousers and a long loose shirt or jacket sat quietly in one corner.

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"Is Joseph in?" Mark asked him.

"In his office," the man said.

Mark beckoned to a door in the wall. He opened it, and they saw a dignified, somewhat melancholy man of about Mark's age working at a wooden desk. The man rose, and Mark greeted him in a language Sari did not understand. The two gravely shook hands. They conversed a few moments before Mark introduced Sari, in English.

"So, we Indians have a visitor from the city," Joseph said slowly, with a faint hint of a smile. "What can I show my friend's friend?"

Sari shook his hand and wondered what to say, but Mark took matters into his own hands. He and Joseph spoke for a moment.

"We'll share our lunch with Joseph before we set out," he said. And that they did. They had brought fruit, cheese, bread and milk. Joseph had some sort of pudding of blood and corn meal and a few vegetables. Mark and Joseph talked in the strange tongue as they ate, and Sari watched the pair. She thought that the smiling Mark was a little graver here, and Joseph less grave than when they had arrived.

When lunch was over, they all walked out into the village. For Sari, the hours passed in a sunlit, quiet melancholy dream. Even the children running and playing did not break the spell.

Sari saw how women carded and washed and dyed the wool from which the beautiful blankets were made. She saw them patiently weaving the blankets, sitting in front of the houses, which always faced east. She admired the careful construction of a sand painting around a woman who appeared to be ill, a ceremony which she could not understand. She marveled at the patient craftsmanship of the jeweler who hammered little bars of silver into shape and fashioned into it the bright turquoise he had polished, and engraved the metal surfaces with bold designs.

There seemed to be all of life in this little world. There was the handiwork of the village, the weaving, making and mending, the family, the ceremonies. Outside of the village were small irrigated gardens where vegetables grew, and separately, sparse corn patches and squash vines in the infertile soil. Farther away were shepherds, so that the Indians would have wool and meat.

A little world, she thought, *but not a closed world.* The clothes, or the cloth for them, had come from somewhere else. She had passed a dispensary where a nurse in a white uniform was washing something from a child's eye. There was a wooden school building, and the store was of wood. The wood had come from elsewhere.

This simple life was not as simple as it seemed. It depended on something else more complicated for its continued existence.

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They returned to the store. Joseph gave Sari a beautiful silver necklace with a turquoise pendant before they parted. She thanked him and shook his hand. Mark and Joseph spoke briefly in the strange language and then they, too, shook hands. There was the slow, dusty drive back to the helicar. Then they were on their way—home.

"How is it that you know Joseph's language?" Sari asked.

"When I was young, I was an anthropologist," he answered. "I spent six months in his village. Joseph became a very good friend."

She wanted to know what an anthropologist was, and Mark told her. It was a fresh thought, that someone should study strange people and how they lived. She tried to imagine herself living in Mark's world for six months, or for a year, and really learning anything about it. She would never learn to understand Mark's world, she decided, even though she already spoke its language. Or, did she, she wondered.

"It must be very difficult to be an anthropologist," she said. "How can you learn about a people in six months?"

"I didn't, Sari," Mark replied. "Many anthropologists have studied Joseph's people, for many years. I had learned about them before I went there."

"Then why did you go?"

"Living with them was an experience I couldn't get from books," he replied. "I couldn't be an anthropologist without that experience. And, too, I looked for changes since the last anthropologist had been there."

"Were there any changes?"

"Not really," he said. "Theirs is a static culture."

Sari thought back to the children the day before.

"Indians must have changed," she said. "They don't run and howl, and they wear clothes."

Mark looked perplexed for a moment, then he laughed.

"Children have strange ideas of Indians," he said. "But you're right. Once there were savage, naked Indians—not Joseph's people though."

Mark told her how the white men had come to America and brought horses and sheep and guns and whiskey and disease into Indian life; how they had forced the Indians into new lands and new ways. He told about the reservations, where the Indians were protected by the Bureau of Indian Affairs. Sometimes, the Bureau had tried to bring the Indians out into the rest of America, and the more enterprising had indeed left the reservations. The Bureau had protected those who stayed behind. As the life of the country grew farther away from theirs, the Indians were—

"Like animals in a zoo," Sari said.

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"Like men in a zoo, perhaps," Mark corrected her. "Or, better, like men acting out a play that has lost its meaning. That is sad, Sari, for some Indians are very good men. Joseph is. Once, the Indians' way of life was the best that anyone on this continent knew. Then, Joseph might have been a great leader. Now he is a caretaker."

"Why did Joseph stay with his people?" Sari asked.

"It would have been very difficult for him to leave," Mark told her. "And, he wanted to help his people."

"Mark," Sari asked, "is the city a reservation?"

Mark looked at her, half smiling, but his eyes were sad.

"In a way, it is," he said. "The people who lived there wanted very much to preserve what they thought they had, and who they thought they were. The Commission of Urban Affairs was compassionate. It encouraged those people's beliefs and helped them to get what they wanted. But no one encouraged or protected other people, and the other people—changed."

"I'm an ignorant savage," Sari cried, "and I don't *want* to be. I want to be a human being."

Mark took her hand, guiding the helicar with the other.

"You are, Sari, you are," he said. "You are a beautiful, wise young woman. People will respect and love you wherever you are."

He held her hand until it was time to land the helicar. It was late by then. Sam had made them a meal which they ate in the kitchen. Then Sari went to her room and to bed, wondering how she could sleep with the thoughts that the day had brought. Her next thought was that she was awake and it was morning.

Sari and Mark were in the kitchen early for breakfast. They scarcely knew what to say to one another, then nor when they joined the young people at the pool. They lay lazily for a while and then walked away from the house.

They paused at Sam's garden, where he was diligently weeding and cultivating. He was full of tomatoes today, how both the red and the yellow were equally ripe and juicy. "The yellow is prettier," he said, "but the red still tastes better. Those geneticists haven't licked that yet. Taste and see."

After they had tasted the tomatoes, Mark talked to Sam about dinner for the two of them. Something special. A cold soup, a salad of course, and those little thin slices of veal in egg—Florentine, wasn't it called? Fresh peas would go well with that—Sam had some, didn't he? Sam did.

From the garden they walked up into the foothills, standing on rocks, climbing along the stream that flowed down past the garden and the pine trees. When noon came

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they ate the fruit beside a falls, where the white water splashed down and drops occasionally touched their skins. As they lay resting after the meal, they stared at the white clouds and played that old game of seeing in them what they would—she, things of the city; he, things from the whole wide world. When they were rested, they climbed a little farther, stopping to look out over the plain, or down at rocks, or up at trees, or the sky. They returned by a circuitous route, and came to the house almost at sunset, a little tired but fresh enough to enjoy the pool. Theirs had been a lazy, pleasant, almost wordless day.

Nor was dinner less pleasant. Sam brought the food to the museum and they ate amid African and ethnic art. Now they talked eagerly of everything that they had shared, of the city, their journeying, of the house and its people. At last they talked again about the reservation and the city.

"I must go back," Sari said, as she rose from the table. Mark rose, too, and put his arm around her shoulders. She felt helplessly at home and more determined than ever to leave. She began to cry softly. Mark drew her to him, and she wept with her head on his shoulder.

"You don't have to go," Mark said. "You can stay here."

"In what way?" Sari asked.

"You can stay—as my daughter," he said.

THE ANALYTICAL LABORATORY

JULY 1969

PLACE	TITLE	AUTHOR	POINTS
1.	And Comfort to the Enemy	*Stanley Schmidt*	2.16
2.	The Mind-Changer	*Verge Foray*	2.36
3.	The Man From R.O.B.O.T.	*Harry Harrison*	2.75
4.	The Great Intellect Boom	*Christopher Anvil*	4.17
5.	The Choice	*Keith Laumer*	4.26
6.	The Empty Balloon	*Jack Wodhams*	4.85

THE EDITOR

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"And grow into what?" she asked.

"You could stay—as my mistress" Mark suggested gravely.

For some reason, this angered her.

"You can't have sex all day," she said tartly. "Besides, you don't need me. You have sex with women who visit here."

Then she wept again while Mark held her gently.

"I'm very, very fond of you, Sari," he told her.

She thought of her mother, comforting her when she was small, and always after that whenever she needed comfort and would take it. And of her father, and her brother. She was fond of them. She loved them.

"I'm fond of you," Mark repeated. "I love you. You know that I want to help you, to do what you want."

"I know," Sari said. "I love you. But it isn't the same. I am—I think you say—I am in love with you, Mark."

"I could be in love with you," Mark said. "But I've been in love before. It's very sweet, and always with a little pain. It's sweetest and sharpest the first time, when you feel that it has never happened before. But it can come again. Don't you think you could be in love with someone else? If you don't tell him what you know?"

She thought of the city and the Bureau of Urban Affairs and of the few bright and able young men and women who were different from the others.

"If you say so, perhaps I could," she said. "And I'm sure I would love my children. You want me to go, too."

"Dear Sari, I don't want you to go. I hate your going. I've been so happy to know you, and to have you here."

"And I am happy, too."

"But I think you should go," he said. "To be a human being, the sort of person you can be, you must go back to your city."

For Sari, that night was neither long nor short, desperate nor reconciled. It was merely there. She lay awake, listening to the noises of the night, not really thinking. Perhaps not really awake all night. Perhaps sometimes sleeping. Finally the dark turned to gray, and then to morning. She rose, used the fresher and went to breakfast. Mark was there, waiting. They said good morning but asked nothing about the night or day.

Mark flew her to the airport. There, he kissed her lightly and wished her well.

"If I can ever do anything for you—anything reasonable—anything unreasonable, ask me," he said.

"I know," she answered.

She knew that there would be nothing he could get for her. ■

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brass tacks

Dear Mr. Campbell:

Your answer to "John Pierce" in "Brass Tacks" of April 1969, was quite to the point—the Anti-heroes do make for a comforting sense of smugness, just roll up in our nice womb of superiority, do our "thing," let the establishment stew in its own juice. We can always live on handouts of welfare—or parents, as the case may be. After all, who wants to ask themselves: "So, why don't I do as well?" To answer that, one has to grow up and that can hurt. Why should I try to emulate the good and positive traits of a hero? I might not be as perfect and that might injure my ego.

I might find answers to some problems if I were to face them like a Hero. Today it's not "IN" to solve problems. It's more "IN" to be part of the problem.

You don't think that way any more than "John Pierce," or the Second Foundation, or I.

I'm all for this Second Foundation. Can a reader of twenty-five years of good science fiction join? How?"

EDWARD V. SIEBENTHAL

Write John J. Pierce, 275 McMane Avenue, Berkeley Heights, New Jersey 07922

Dear Mr. Campbell:

My additions and corrections to your alphabet follow:

I *Iatrogenic* is pronounced with a long I. I suggest *ihleite* (pronounced eelite)

J *Juarez* is not in the OED, but *junker* is O.K.

L Llama is all right but I stumbled across *lsdeism* (from British L.s.d. not lysergic acid diwatchamacallit). It refers to the worship of money.

N All I could find was *ngou* an obsolete variant of *gnu*.

P I prefer *phthisic* to *ptarmigan* on the grounds that it is just a shade more obfuscatory. It is also the only phth word that OED pronounces t rather than fth.

Q. I would rather use a modern word than an obsolete one wherever possible (with N S and Z it wasn't possible). Thus, *quay* rather than *quiche*.

R Anybody who wants to read through the entire half volume OED devotes to R is welcome to do so.

S 'sblood

T *Tsaing* (the T is silent in this version of the word). OED pronounces *Tsar*, "Tsar" not "zar."

U Never did like urn, but *Uigur* (pronounced weegur) is nice.

V *Velvngericht* is my favorite, but what about *vlanker, vlaske* or *vlat* (middle English or dialect variation of *flanker, flask* and

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flat)?

W I prefer *whole* to wraith on the rather shaky grounds that someone might detect a slight w sound in *wraith*.

Y *Ypres* is not in OED. I suggest *ytter*.

Z Couldn't find Zhmud in OED. (In fact, I couldn't find it anywhere.) The best I could do with Z was 'zfoot (variation of 'sfoot).

DAVID CRAIG
18 Walk Hill Street
Jamaica Plain, Mass. 02130

"Zhmud," I'm told, means a member of a low-land peasant group of one of the Central European people. Archaic words are more apt to be unfamiliar—and thus more confusing—than modern. "Quiche" stands. But "Vlaske" and "Vigur" are triumphs!

Dear Mr. Campbell:

The question you raised in the June 1969 issue of Analog concerning the fact that a maple tree cut one hundred feet above the ground will drip sap can be answered if one considers the way by which the sap rises in the tree.

Trees need an ascending stream of water in order to maintain the wet environment that plant cells need to live and in order to provide the top, leafy parts of the tree with the dilute soil materials necessary for the construction of new plant cells. This vital water-carrying function is fulfilled by the xylem cells which, in broadleaf trees like the maple, form long capillaries up to several yards long deep within the tree. Water moves up the xylem under two types of pressure at two different times of the year. In the early spring, before the leaves come out, water begins to move up the tree under a positive pressure that is the result of the presence of organic material (such as maple sugar) in the water. This kind of sap is found within the xylem tubes in March and serves the purpose of supporting the growth of shoots in April. A high osmotic pressure between the sugar-rich xylem water and the ground water is what forces the water up the trunk.

Eventually, though, the sugars that were created by photo-synthesis during the previous autumn and stored throughout the winter become used up. With no more organic substances being introduced into the xylem water, the positive pressure drops. However, it is May by then and the water continues to move up the trunk, but this time under a negative pressure. This pressure is supplied by the newly-grown leaves, which, as sites of transpiration, utilize the high absorptive potential of dry air to suck up water from the roots. The ascending column of water does not collapse after rising thirty-three feet—the maximum height that a laboratory vacuum pump can normally lift a column of water

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—because water confined to a thin capillary can have a tensile strength of as much as 2,000 pounds per square inch due to cohesion between molecules.

It is not surprising, then, that sap flows from the trunk of a punctured maple tree during the spring when the rising water is being pushed up from below. However, no such pronounced dripping will occur during the summer when the rising water is being pulled up from above. An excellent article on this subject is "How Sap Moves in Trees," by Martin H. Zimmermann, *Scientific American*, March, 1963; reprint number 154.

PATRICK CAREY
131 Lyman Street
South Hadley, Maine 01075

Why trees may have heartwood but don't need a heart!

Dear Mr. Campbell:

Recently my friends and I were involved in a heated discussion concerning the best point in space-time to start a divergent track. After much argument, and with many reservations, we decided that it would be hard to pick a better spot than the Florence of Lorenzo the Magnificent.

Among our reasons were the facts that: A. The Medicis had reached an understanding with the Church at least concerning usury; B. capitalism as used by the Medicis was a startling innovation; and C. among the men who received Lorenzo's patronage were Copernicus and Leonardo da Vinci.

I wonder which time and place other Analog readers would choose. Even more important which place would you choose yourself?

DENNIS DAVIES
5 Bradford Street
Grangetown, Cardiff, Wales

Copernicus—a wealthy nobleman in his own right—didn't need patronage, just the equivalent of the modern passport. And—how about the time of the Greek scientists, like Hero.

Dear Mr. Campbell:

Re Editorial:

The way to win the political victory, which is the ultimate reason for our being in Vietnam, is to do what the North Vietnamese were planning to do. Its essense is simple, and the method has worked with a fair degree of success to date. You shoot or jail those who actively oppose you, secure the compliance—willing or unwilling—of the majority of the population, and indoctrinate the young in the One True Way. However, it would seem that the only group in America with the requisite ruthlessness to do the job for our side in Vietnam are the SOS and their affiliates—but they'd like nothing better than to see a Communist victory.

WILLIAM J. GORMAN

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There are two ways to have a world of friends:

1. Annihilate everyone who isn't friendly.

2. Earn the respect and liking of everyone around.

Which involves the least thought and learning? And thus appears simplest?

Dear Mr. Campbell:

As a teacher of economics, I have often commented on a fact which I first noted when I began reading science fiction as a graduate student; namely, that a relatively large number of science-fiction stories have a substantial amount of economics in them. Others have also commented upon this fact, and some have even gone so far as to imply that learning economics from a story is more enjoyable than listening to a lecture on the subject. (See the letter from Mr. Dennis Barr—June 1968.)

While I obviously could not hold such a heretic view as Mr. Barr's, his letter and Christopher Anvil's story "The Royal Road," which appeared in the same issue, crystallized my desire to make up a supplementary reading list of science-fiction stories for a Principles of Economics course. This course appears to be the one economics course where lack of enjoyment in learning is most apparent.

Unfortunately, my knowledge of science-fiction literature is rather limited. Therefore, I would appreciate it very much if you and your readers could suggest some titles to be included in such a list. Any story, whether remotely or directly connected with economics would be acceptable; neither does the length of the story matter. If the stories appear in a magazine or anthology, it would be helpful to know the title, since ultimately I would like to assemble at least part of the selections in our library. Any help at all with this little project will be greatly appreciated.

It would be inappropriate to close this appeal for aid without mentioning the magazine that kindled my interest in science fiction. Reading Analog is extremely pleasurable and often intellectually stimulating—I always recommend it to my students. Thank you for the stories and the editorials.

WILLIAM W. CURTIS
Assistant Professor
of Economics
University of Montana
Missoula, Montana 59801

The principles of economics naturally appear in science fiction; the first principle, of course, is: "Any organism that expends energy faster than it takes it must fail." Just because it's also put: "Don't spend more than you earn," doesn't change its rigor or its fundamental nature.

Dear M. Campbell:

As usual, your editorial was the first thing I read in the June issue

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of your magazine. Now I only need to know one thing: when will the microphone be available, and from whom? About the new spacesuit: if anyone finds a way to get into it, I'd like to hear about it. Skin divers have had that problem for years, trying to get into a wetsuit. On the general subject of a simpler way to do things, how about a new way to make an ammeter—a whole new principle. For instance, it could be an audio oscillator with a frequency output controlled by input level. The frequency output would have to be digitized to the various musical notes, although I doubt that I could read the meter even then. But that shows the general principle. Anyone have any ideas?

MICHAEL MAXWELL

1004 S. 4th Street

Champaign, Illinois 61820

How about that ammeter that doesn't have to be hooked into the circuit? Introduces no change in the circuit, and is a quick connect-disconnect device. What new idea do you want?

Dear Mr Campbell:

Whaddya mean, science-fictioneers rate a straight F grade on the problem of a workable spacesuit? F. L. Wallace solved that one in "Address: Centauri" more than fifteen years ago; in Chapter Five, the heroine improvises an emergency spacesuit with wrap-around bandages for support and low-pressure, high-oxygen air fed into a helmet. The author did slip a little in referring to the "cold" of space, but his overall logic rates at least a B+.

You know, today's Elegant Solution would be even more elegant if NASA included a few female astronauts. Women usually weigh less, are good at small-muscle work—and they're trained from adolescence to cope with tight garments and inaccessible zippers.

CLEO HINDMAN

Box 32

Stockport, Ohio

I don't recall that story—but scf. long since pointed out this advantage of the female astronaut. Or a midget!

Dear John:

Re Mr. Heinz's comments on the Chinese origin of the horse collar (ASFSF, 6/69, pp. 167-168), unless I am misinformed, the actual Chinese invention was the breast strap or postilion harness. This was brought west—probably by the Central Asian nomads—and appeared in the West in late Roman Imperial times. The invention of the horse collar proper was later, exact time and place unknown; but the first solid evidence for its existence is in the Bayeux Tapestry, c.1070. Kaor.

L. SPRAGUE DE CAMP

The problem seems to confuse experts—but the solution was clearly a major invention!

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P. Schuyler Miller

THE CART AND THE HORSE It has become an axiom in some science-fictional circles that the type of SF published in Analog represents the survival into civilized times of certain archaic forms of story telling that got their start right after the australopithecines of "2001" saw that monolith. It is a corollary that my own tastes are prehominid, and that I get my greatest kicks listening to the rather limited conversation of feeble-minded planarians.

According to the gospel as read by these *avant garde* savants, *real* SF— sometimes called the "New Wave," or "New Thing," or "speculative fiction" or "speculative fabulation"—was born when an English science-fiction magazine, *New Worlds,* was reborn. As edited and published by "Ted" Carnell, *New Worlds* had been as big an influence in the rebirth of English science fiction as Astounding had been in the States—but it was just as square as Analog. Now, published and until recently edited by Michael Moorcock, it has become the glowing beacon that shows what SF shoud be.

I've been storing up bile for a defense of square science fiction, and I may yet make it, but I've been stopped in my tracks by a fortunate coincidence. I've seen my first copies of *New Worlds,* and the publishers of *Odd,* an excellent fanzine produced by Ray and Joyce Fisher of 4404 Forest Park Avenue, St. Louis, Missouri 63108, sent me their issue Number 20. It contains an article by Michael Moorcock in which he spells out quite plainly what he thinks his magazine is.

One thing was immediately evident. The American prophets of the New Thing have the cart completely before the horse.

In *New Worlds,* Michael Moorcock, his associates, and a group of

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English and American writers, many of whom have been and are "big names" in science fiction, are publishing an *avant garde* magazine *of all the arts* which finds a rich source of themes and ideas in science fiction and fantasy—"SF." Because it is concerned with experimentation in fiction as well as in poetry, painting, and every other field of artistic expression, its authors may use experimental techniques. Number 189, which just arrived, has what I suppose would be called a "concrete" poem by D. M. Thomas, called "Labyrinth," whose actual words wander back and forth over the page until they form a labyrinthine pattern of total confusion—unless you follow them from the beginning. It also has a typical grim, relentlessly savage story by Harlan Ellison about a boy and his talking, telepathic dog in the shambles of a post-war-III world. The dog finds him a nice, tender bit of tail from the downunder village of buried Topeka . . . they are trapped by a gang . . . he follows her into the underworld. It's not a nice story—Harlan, as a matter of principle, doesn't write "nice" stories—but it communicates a mood, a picture, a philosophy. It's old-style science fiction with the family-magazine wraps off.

In the same issue is the third installment of Moorcock's "A Cure for Cancer," a sequel, or companion, to his "The Final Programme" (Avon No S-351) which was touted as *the* first "New Wave" novel when it came out last year. This, to me, *doesn't* communicate.

The horse-before-the-cart, square, reactionary facts are simply that the English literary establishment has opened the gate and let science fiction in. It has found the ideas and themes of science fiction as bizarre and stimulating as the most abstract painting, the most cacophonous music, the most noncommunicative "poetry," the most incoherent philosophy of nihilism. It is playing with them like a happy child, or maybe like a rebellious teen-ager. Some of the results are wonderful; some of them are *ekkk*.

I think it may be proper to quote at length from that article of Michael Moorcock's in *Odd*—copies are a dollar from the publishers, if they have any left—since you probably won't have a chance to read it all:

"*New Worlds* was (to be) a magazine . . . that could produce a worthwhile synthesis of post-war art, science and ideas, presented in the form of fiction, chiefly, also poetry and graphics, running features that reflected current concerns in the arts and sciences. . . . If *N.W.* is in the vanguard (of new areas of content), it is chiefly because its writers are more familiar with these areas—because they are sf writers and readers—and are more capable of assessing and assimilating them than most other writers

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who, like John Barth, treat the subject matter in a shallow and unsatisfactory way, regarding it as essentially superficial stuff that is capable of giving a gloss to a traditional form."

The real purpose of the "New Wave," as seen by the man who threw the stone in the water, is *not* for science fiction to adopt the incoherence and hopelessness of mainline establishment "fiction." It is for SF to *contribute* new vigor and new strength to the increasingly sterile mainstream—vigor and coherence that has been one of its chief features for years.

That new wave anyone should be glad to ride.

THE AWARDS—NO. 1

By the time you read this, the science fiction fans will have made their awards in many categories to their choice of the best science fiction and fantasy of 1968—the *"Hugos."* I'll report on the winners as soon as I find out who they are. Meanwhile, the members of the Science Fiction Writers of America have made their choices and passed out their "Nebula" awards. In fact, a collection of the short fiction winners and runners up may be out before this is published.

Analog had one winning story this year: Anne McCaffrey's "Dragonrider," which was voted Best Novella. Alexei Panshin's excellent first novel, "Rite of Passage," was named Best Novel over John Brunner's "Stand on Zanzibar"—my own choice—and Robert Silverberg's "Masks of Time"—another very worthy contender. The best shorter fiction, Richard Wilson's "Mother to the World" and Kate Wilhelm's "The Planners," novelette and short story winners respectively, are both from Damon Knight's anthology of previously unpublished SF, "Orbit 3." You can read them in the paperback edition (Berkley No. S-1608; 244 pages; 75 cents)—and "Orbit 4" is out with a new batch of contenders.

LOST ATLANTIS: NEW LIGHT ON AN OLD LEGEND

By J. V. Luce • McGraw-Hill Book Co., New York • 1969 • 224 pp. $9.95

VOYAGE TO ATLANTIS

By James W. Mavor, Jr. • G. P. Putnam's Sons, New York • 1969 • 320 pp. • $6.95

The Atlantis story is as deeply entrenched in science fiction as any theme except the voyage to the Moon. Indeed, most serious scholars—including the ancient Greeks—have believed that it is a kind of science fiction, invented by Plato for an unfinished "what if" triology in which he would set forth his theories of the perfect and imperfect state.

Recently there is growing support for the theory that Plato was retelling an Egyptian legend which his ancestor, Solon, had brought

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back, but that for various reasons some of the times and distances were garbled by a factor of ten, so that a real "Atlantis" had been destroyed nine hundred years before Solon's time, not nine thousand—when even the Egyptians were still using stone tools. As long ago as 1909 a young scholar in Belfast suggested that the real Atlantis was a memory of Minoan Crete. Thirty years later, in 1939, a Greek archeologist, Professor Spyridon Marinatos, suggested that the Minoan island empire had been destroyed in a volcanic upheaval about 1500 B.C. and even pinpointed the source of the catastrophe on the island of Thera, midway between Crete and mainland Greece. And within the last few years seismologists and oceanographers have been adding to the evidence that the explosion of Thera was as devastating as the famous eruption of Krakatoa, whose airwaves were picked up on the other side of the world.

These two new books give very different accounts of the current state of the Atlantis-was-Crete theory. Professor Luce is an authority on classical Greece who teaches at Trinity College, Dublin. Mavor is a young oceanographer at the Woods Hole Oceanographic Institution in Massachusetts. Luce writes a thorough and analytical account of all the evidence from the perspective of a lifetime of study of Greece, Crete and the ancient world of the Bronze Age. Mavor writes a rather naïve account of personal adventure which ended with him and his associates barred from Thera. It seemingly had never occurred to him that any American scientist—no matter that he had no competence in archeology and no background in classical history—could not simply go to Thera and dig, and hang the red tape. When he returned to Boston to give a press conference announcing to the world that Thera *was* Atlantis, and that he had found it—without bothering to mention Marinatos, who was in charge of the serious excavations of Minoan ruins on Thera—the fat was in the fire.

I recommend the Luce book in any case; the Mavor book for collateral reading. Luce does not agree that Thera "was" Atlantis; he believes that the eruption of Thera, with the accompanying *tsunamis* or "tidal waves," destroyed nearly all of the great Minoan cities and probably sank the fleet with which Minos had extended his power from Egypt and Palestine to Sicily and Italy. Tons of volcanic ash, showering from the skies, probably destroyed the fertile farmlands of Crete and the Minoan colonies in the Aegean. The Minoan society and empire were destroyed, literally overnight, as Atlantis was. Eventually Greeks replaced Monoans in Crete and built up another maritime empire.

I really think we've found Atlantis. In time archeology and

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oceanography will round out the picture, and maybe Mavor will make contributions in his own field of oceanography which—to do him justice—are what he wanted to do from the first. It's even possible that in some Greek monastery is a copy of Solon's own account of his conversation with the priests of Sais, which Plato is supposed to have seen.

THE LAST STARSHIP FROM EARTH

By John Boyd • Berkley Books, N.Y. • No. S1675 • 182 pp. • 75¢ • Weybright & Talley, N.Y. • 1968 • 182 pp. • $4.95

This is a case of a book whose paperback edition appeared on the local stands before I succeeded in getting a copy of the hardbound edition. I am listing both, so you can watch for the latter, which has presumably been remaindered.

I don't know the author, but his book is an excellent one. It shows us a society in which specialization has been carried to the extreme of compartmentalization. As in the medieval guilds, you are born into your trade and class. A mathematician like young Haldane IV does not write poetry, does not read poetry, and certainly does not fall in love with a poet like Helix. But, of course, he does.

Mathematicians stand high in the status order, because it was a long-dead mathematician, Fairweather I, who rationalized and computerized this ultra-orderly society . . . even to the point of constructing a computer Pope and establishing a literal Hell on a distant planet to satisfy the state's religious needs and enforce lost discipline. Then Haldane learns that Fairweather was also a poet, and his world begins to come apart. Finally, he and Helix are caught and condemned to Hell.

I'm sorry I came to this so late. I hope the paperback stays in print long enough for you to find it.

NONE BUT MAN

By Gordon Dickson • Doubleday & Co., Garden City, N.Y. 1969 • 253 pp. $4.95

This isn't one of Gordon Dickson's more successful books. He has lost none of his ability to write lively action yarns, and he is stressing the relativity of right and wrong —a basic when one must deal with other cultures, let alone other species—but he's done better before.

Expanding into space, Mankind has at last come face to face with a powerful alien race, the Moldaug, who are demanding that Man abandon many of his colonial worlds. The home government is ready to acquiesce; the colonists are not. And one trouble-making faction led by one Cully O'Rourke sets out to force defiance and, if need be, war on the stay-at-homes.

They do it by studying the Moldaug and playing on their traditions

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and superstitions, making it evident that Mankind is a race to be considered equal in power and will. Meanwhile, the politicians back on Earth are desperately trying to undercut them. But Cully is coming to know what makes the Moldaug tick. "Know thy enemy . . ."

There's plenty of mileage in the confrontation theme (look, ma, up to date words!). There will be plenty of other good stories about race meeting race in the depths of space. Gordon Dickson may be writing one right now, better than this one.

THE DRIFT

By Lloyd Kropp • Doubleday & Co., Garden City, N.Y. • 1969 • 263 pp. • $4.95

The story of the ancient ships trapped in a perpetual eddy in the heart of the Sargasso Sea is one of the oldest and most durable in science fiction. I thought it was played out, but here is a new—and good —variation on the old theme. True, we are left with the suggestion that the whole experience may have been a hallucination. (We are never told how much real time elapsed between the hero's being cast adrift in a small boat and his rescue.) We are also told of atmospheric distortions that hide the Drift of interlocked and ancient ships from passers-by on sea or in the air.

Doubts aside, the author has developed the traditional Sargasso story fascinatingly well. He shows us the strange society of the Drift, developed over the centuries, much as one of the more familiar science fiction regulars would describe a "lost" colony on a far planet. Its laws, its legends, its factions, its superstitions, its beauty and its ugliness. The tormented product of modern high-pressure society finds it strangely attractive . . . but he cannot leave well alone. He cannot sink back into a timeless culture.

A strange book, which some will call fantasy rather than science fiction, but a good one.

THE NAVIGATOR OF RHADA

By Robert Cham Gilman • Harcourt, Brace & World, New York • 1969 • 223 pp. $4.25

This is the second in a series of books by the Pseudonymous Mr. Gilman, nominally juveniles but every bit as good as the average action yarn written for adults. There are touches of Asimov's "Foundation" books in the series, of Poul Anderson, of Gordon Dickson, but Mr. "Gilman" is his own man.

He has also withstood the temptation to write his series by merely stringing together adventures in the "Tarzan" or "John Carter" manner. The events of this second book take place two generations after those of "The Rebel of Rhada," and almost the only direct continuity is the character of the almost immortal Vulk, symbiote of the star em-

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perors and their kind. In the first book we saw signs that the Second Stellar Empire was decaying; in this, there is open hostility between the politicians of the Empire and the Navigators, the semireligious order who have preserved enough empirical knowledge of the First Empire so that they can run the star ships by rote and practice. Young Kynan, newly taken into the order, finds himself the puzzled center of much of the plotting and counterplotting.

The story is good, the setting excellent. If "Robert Gilman" is writing adult science fiction, I have to find it.

THREE SURVIVED

By Robert Silverberg • Holt, Rinehart & Winston, New York • 1969 • 117 pp. • $2.95

This book is several levels above the former Winston science-fiction juveniles, and for that matter several notches above the books Robert Silverberg wrote for the series. This should surprise no one who is reading Silverberg's recent books.

"Three Survived" is a rather simple adventure story, a strong character study, and one that teaches a lesson—like any good, old-fashioned juvenile book. There are three survivors of the wreck of a starship: Tom Rand, an engineer; Dombey, a hulk of a crewman; and Leswick, a philosopher. As the only competent one of the three, Rand takes command and gets them safely down on the surface of a planet where there is a signaling station which will bring them help. He resolves to get them there if he has to kill them in the effort.

Only it's not that easy. There comes a time when it is the hulking, stupid Dombey whose experience comes to their rescue. And even the Metaphysical Synthesist, Leswick, finds occasion to use his special talents. The arrogant and righteous Rand learns a little something.

Simple? Obvious? Certainly—but forceful and beautifully done.

UBIK

By Philip K. Dick • Doubleday & Co., Garden City, N.Y. • 1969 • 202 pp. • $4.50

Philip K. Dick seems to be the Van Vogt of the "new" cycle of major science fiction writers. Like Van Vogt, he has done a few extremely good books—"The Man in the High Castle" is his "Slan" —and many others that are less memorable but not at all forgettable. Like Van Vogt, he has adopted the pattern of extreme wheels-within-wheels plot complexity, in which nobody knows from page to page what is going on and who is on whose side. He usually resolves the tangle better than Van Vogt does, or did, but not in this one.

In the beginning, we have a future industrial espionage yarn unfolding nicely but conventionally. Telepaths and other psi-talented people have an obvious value when

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it comes to reading trade secrets from people's minds, seeing through solid walls, and so on. Runciter Associates is a kind of counter-espionage organization whose employees can neutralize the psi fields of the spies. Several of the country's top telepaths have vanished, and Runciter is determined to find them. He thinks he has, when a team is hired for a neutralizing job on the Moon. They go there—and are killed. But the story is just beginning.

You have to read this yourself to untangle it, and I'm not sure you will then. I'm not at all sure I have. At first sight, Runciter was killed and the team members are under some kind of attack that destroys them one by one. But things happen that suggest they are dead or in some sort of fantastic limbo, where a live Runciter is trying to reach and rescue them. Time keeps shifting strangely and unpredictably. And there is the patent medicine called "Ubik," which seems able to arrest the change but changes itself.

Maybe I'm just not with it any more. Call this the most psychedelic of Dick's books . . . or one that got away from him.

THE DAY OF THE DRONES
By A. M. Lightner • W. W. Norton & Co. New York • 1969 • 255 pp. • $4.05

Miss Lightner is, so far as I know, science fiction's first lepidopterist. She has done at least four good juvenile SF books, including the more than good "Doctor to the Galaxy," and this time has outdone herself. It's a pretty stuffy adult who can't enjoy "The Day of the Drones." Or, perhaps, a bigoted one—because Amhara, the heroine, and her people are black.

The white nations have all but destroyed the world with nuclear warfare. Little pockets of survivors exist, shut off from each other by radioactive wastes and by the loss of past technology. Amhara's people are in the highlands of Ethiopia and as the book progresses they find another, smaller fragment of the whites in England. They also find the mutant bees which give the book its name and keep the whites in subjugation.

The isolation of biological populations, reproducing the Pleistocene conditions which gave rise to the present races and subraces of mankind, is creating both physical types and strange social orders. In this book they begin to discover each other again.

It's the best juvenile SF I've seen so far this year. If it were a paperback original, you'd never hesitate to read it. So why let a young heroine put you off?

CROYD
By Ian Wallace • Berkley Books, N.Y. • No. X616 • 184 pp. 60¢

Here's a real "sleeper"—a superman story whose hardcover sneaked out, practically unnoticed, some

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time in 1967. The hardback publisher, Putnam, sometimes sends books for review and sometimes does not. In this case, I didn't even know it existed . . . so the reprint deserves full treatment.

There is, for some reason, a strong flavor of "Doc" (Skylark) Smith in the story—yet it is by no means pure space opera. You might call it a new generation of the old genre. Gnurls—nasties from the Large Magellanic Cloud—have by no means occupied their own small galaxy, but they are determined to take over ours. They can project or inject their minds into other beings while their bodies lie in stasis, and the book's antiheroine, Lurla, does just that. Pitted against her is the Defender of Mankind, the super-agent Croyd, who can also get into other people's brains—including hers. And, just to keep things from getting dull, there is a sort of New Left revolt of the umpty-umpth century going on in the wings, which also requires Croyd's talents.

Shuttling back and forth among each other, the protagonists and antagonists will make you dizzy. It's fun, though.

OMNIVORE

By Piers Anthony • Ballantine Books, N.Y. • No. 72014 • 221 pp. 75¢

Here is a strange one by the author of the even stranger "Chthon" and the prize-winning "Sos the Rope." It may take several readings and a better background in symbolism and psychoanalysis than I have to prize out its full intent and meaning.

On the surface, it is the story of three scientists, a physical giant, a sick cripple and a woman, who are studying a strange and hostile planet. Their talents and their personalities complement each other; they are in a degree living emblems—archetypes—of three physical and psychic types: the herbivore the carnivore and the omnivore. Who wears each symbol and what this signifies, you must discover for yourself.

We meet and study the three as a secret agent, Subble, tracks them down and questions them about what happened on Nacre, the fungus-world with its frightful monsters. We learn with Subble that they have brought back one of the higher creatures from Nacre, tagged "mantas" for the fish they resemble, and that these mantas are breeding on Earth and may be a danger to mankind. So Subble hunts the mantas . . .

It is a strangely unsatisfactory book, for reasons I can't pin down. Perhaps, as I suggested, it is because I can't get past the screen of symbolism to the real core of the book. I can say that the mantas are one of the strangest and most believable alien breeds we have had in a long time. More interesting, in fact, than the human characters.

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Editorial, continued from page 7

was leached out and thin to begin with. They were a very poor people who had little, but freedom, to work with. They weren't under pressure from others because nobody wanted that bleak land.

Another people, in another part of the world, had troubles with heat, hard work, limited freedom, and very limited resources. The resources all belonged to others.

Each group had one problem in common; they wanted a musical instrument.

The Blacks of Trinidad took discarded steel oil drums, heated the ends, dinged them in with hammers, cut the drums down to half, a quarter, or less, and thus tuned them. Ever hear a good Steel Band? Bill Bass's group doing Mendelssohn's "Spring Song" on a collection of beat-up oil drums is something you wouldn't have believed beforehand. Old Felix Mendelssohn would have been delighted.

While the best my own good Scots ancestors could come up with was the bagpipe. It's great for stirring the blood, and getting an army marching, but I cannot maintain that it is a thing of beauty and joy.

I submit there's an inherent difference in the intelligence applied by the Blacks and the Scots when faced with fundamentally the same problem; extremely limited resources, and a need for a musical instrument.

Most problems men face aren't so simply related or equated; how *different* kinds of intelligence react to the problems, encountered have not, of course, ever been studied. Such a study would hardly appeal to a Scholar type, whose whole training has channeled him in the belief of one-and-only-one Intelligence.

About three to four centuries ago, the Highland Scots had about the same level and type of culture that the American Indians of the time had; they were both bloody-minded barbarians. It took time, and pressure, and a lot of throat-cutting, but the Scots eventually got the idea; they've done very well for themselves since. At least one of them managed to get in on the ground floor of the Industrial Revolution with a steam contraption, and their lack of resources had developed a canny sense of thrift in them; it was another Scot who built the U.S. steel industry.

They, in other words, had fundamentally the same *type* of intelligence that the general Caucasoid group had, and were able to take over that culture and fit it to themselves rapidly.

The Blacks appear to have a subtly different *type* of intelligence;

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they've certainly outdone the Scots in music, as one example.

If their basic intelligence pattern is of a different type—naturally it's far harder for them to fit into the Scholarly type that Caucasoids developed—with unquestionable and world-shaking success—so that although they've been working into Western culture for as long a time as the Scots, they haven't been able to fit in anywhere near as well. Sort of porpoise out of water effect.

Incidentally, the matter of slavery is a lot less important than a lot of people appear to think it is. Several of my ancestors came over as slaves—bondsmen, sold to colonists for their passage. And just remember that practically every civilization in history has arisen from a people who had first been enslaved. What turned those Semitic desert wandering nomads into the great Jewish culture? Slavery in Egypt, where they learned to want the organized life of a town.

I believe the important factor is a difference in intelligence—not a better-worse, superior-inferior difference, but a different-line-of-development difference.

The trouble is, today every effort is being made to suppress any study of any difference between Black and White—as the National Academy of Sciences did—thus assuring that no discovery of what that difference is, and what it means, can be forthcoming.

But one thing can be observed; integrated schools are *not* optimum for two different *types* of intelligence. Since the Whites achieved high development first, inevitably we've dominated.

The great French mathematician, Pascal, had a very difficult time with his father. Papa was an important businessman, and insisted that young Pascal learn proper business-like, practical things like Law and Commodity Market problems. Pascal was not permitted to have any books on mathematics or geometry —Papa insisted that his keen mind *must* learn to think the kind of thoughts Papa thought.

Pascal Pere finally gave up when he discovered that his son had, by himself, and simply because he felt the desire, developed the first four Books of Euclid, plus a few dozen oddments of his own.

I wonder what would have happened to young Albert if Papa Einstein had insisted he must study to become a doctor?

Or if Beethoven had been forced to become an accountant?

Not all intelligent men have the same kind of intelligence; a man with genius potential in area P can be forced into a mold that turns out a third rate, unhappy and ineffective Q.

Are you *sure* the same thing can't happen to a whole race?

Are you *certain* there's no difference between Black and White intelligence? The Editor

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Only you can prevent forest fires.

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The first human born on Mars was a "grok" specialist!

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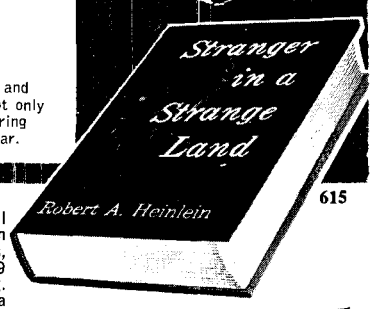

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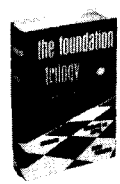
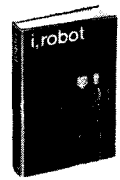


622. The Foundation Trilogy, by Isaac Asimov. The ends of the galaxy revert to barbarism. Pub. ed. **$10.50**

623. 2001: A Space Odyssey by Arthur Clarke. 5 men and computer trigger cosmic "booby trap". Pub. ed. **$4.95**



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